NATURE MAGAZINE
VOLUME 26 · AUGUST · 1935 · NUMBER 2

BEAVERS

Intimate Glimpses of a Colony in the Wilds

By WENDELL *and* LUCIE CHAPMAN

THREE wild beavers crawled out of the water, dragging their flat tails on the ground. They reared knee high and put their clammy, damp paws upon us while looking and sniffing inquisitively into our faces. This was our evening greeting by members of a colony as we sat quietly on the shore of a pond in the Rocky Mountains, watching their preparations for winter. But the beavers did not come near us until almost dark.

Evening after evening they dived out of their houses, reared half out of the water and with dripping brown coats glistening in the lowering sunlight turned, as if camera shy, to go elsewhere about the pond. As soon as the light had faded, back they came to scramble all about us, almost devoid of fear while they inspected us and our now useless cameras.

It was not until our third harvest season with them that they abandoned their reserve or roguishness, whichever it may have been, and allowed us to pet them in broad daylight. And during those three years we learned much of the beaver's personality.

Playing has an important part in the life of the youngsters. One afternoon we saw two small beavers start a wrestling match in shallow water. Rearing up and with forepaws embedded in the other's fur, each clutched the other by the shoulders. Turning their heads sidewise, they interlocked their incisor teeth, like the loose links of a chain, and began a gnomish dance, swaying back and forth and from side to side.

Seemingly the object of the contest was to push the other fellow over. They churned up the water with their large, webbed hind feet. In half a minute both fell over sidewise, splashing under with teeth still interlocked while they dived nose to nose into deeper water. A few feet out in the pond, both arose separately, shaking the water from their heads and swimming away together like the happy comrades they were. But who won? That is difficult to say, because with teeth interlocked, both went over and under at the same moment. However, the beavers seemed much pleased, and no doubt understood their game.

© WENDELL CHAPMAN

NOSING ALONG THE LIMB BEFORE CUTTING
Often the immature beaver uses poor judgment and cuts more than he can haul or spends an hour cutting off a nubbin

If the saying, "With malice toward none, with charity to all" can be applied to any creature, that creature is certainly the beaver. Yet with all his peacefulness and nonaggression toward his wild neighbors, he is alive with personality.

Everyone knows that the beaver is famous for his diligence and per-

© WENDELL CHAPMAN

FRIENDSHIP GAINED AFTER LONG AND PATIENT WAITING

After the third season with one colony the beavers would come up to the authors before dark. They salvaged whatever aspen branches they could find and used them for food or repairs

sistence. What many do not realize is that this determined animal is also patient and kindly. He is not mean, even though he is headstrong. The fact that determination is ingrained in his nature was evident on many occasions as we observed the colony.

One evening a half grown beaver kitten came to the shore and stretched up to his full ten-inch height testing the air before investigating a green chip dropped at the water's edge. The chip came from a tree that we had cut down. When the beavers cut the tree it had lodged against another, resulting in their having to abandon it. The chip was almost as large as a cross section of the kitten, who turned it over and over, murmuring a soft, though energetic, soliloquy all the while. His intonations and pantomime indicated an Alice in Wonderland awe for the imaginary beaver who could cut so large a chip.

The kitten sniffed the piece of wood thoroughly and with much effort wedged a corner into his mouth for carrying. Then with more bustle than speed he swam for the beaver lodge. Scrambling up the helter-skelter pile of sticks and mud that formed the house, he began search for a place in which to fit this new shingle. Of course, the chip, with its strip of green bark, should have been placed in the storage pile for winter food, but the kitten was, apparently, confused by its size and shape. No holes were the right size, the chip just wouldn't fit on the roof. But the kitten persisted and with incessant murmuring he crawled over the house as if his was the only problem in the world and as if upon him alone rested the supreme responsibility of solving that one problem.

Older beavers were swimming through the water, hauling limbs for storage and anchoring them in the mud bottom of the pond in front of the house. When they approached with their loads, the kitten's murmuring rose in pitch, speed and volume in a vain attempt to attract their attention. But as these laborers left, his voice softened again to confidential communion with himself.

At last, after climbing over two sides of the lodge and gouging his tender webs and cupid stomach on many protruding sticks, he found a hole where the queer chip could be wedged. At this triumph, his murmuring changed to low squealing. After patting in the chip he tumbled enthusiastically into the water and swam with bragging murmurs to his mother, who was approaching with a load of aspen limbs.

No human child could have conveyed more vividly his delight in having accomplished a grown-up task. And certainly no human child could have shown greater desire to have others take notice of his accomplishment.

When we first learned of this particular colony, most of the beavers were away on their summer vacations. During July and August, all but the mother and her kittens left for a nearby river. Here they scrambled up the cut banks for willows when hungry, splashed into the river like chunks of caved-off sod, played on the sand bars or basked in the sun, and slept in whatever log jam or hole in the bank happened to be near at hand.

At the hint of an early autumn frost three grown youngsters struck out in quest of homes of their own. The rest gave up their leisurely excursions and returned to their established homes. Before the leaves of the quaking aspen trees began to turn in color, the colony had repaired the dams and lodges in preparation for the coming winter. Those now left at the home pond were four adults, three year-old youngsters, and two half-grown kittens, who had been born the previous April.

© WENDELL CHAPMAN

BUSILY CUTTING A LIMB THREE INCHES IN DIAMETER

However, a limb of this size makes an easy load for an adult beaver to drag overland to the water and then to tow away for storage

The first concern of the family in preparation for winter was the lodge. During the spring and summer it had been allowed to run down. Rains had washed much of the thawed mud from the wooden framework. This the beavers had desired because it gave the mother and kittens better ventilation for the summer. But now that autumn had arrived, they went to work reinforcing the wooden structure of the house, first with sticks and then with mud, to keep out the winter cold.

Grasping dry poles and sticks in their teeth and dragging them to the pond, the beavers towed them to the house. They then clambered up the sides, shoving the added wood into any convenient hole. Sometimes they cut the standing dead trees on shore when loose sticks were not near at hand. Within a week the framework of the house had been reinforced and the plastering had begun. This was a most interesting and sometimes amusing process.

One evening, as we sat on the shore nearby, an old beaver dived under the edge of the house and came up with her arms full of mud. With the load tucked under her chin, she arose on her hind feet at the water's edge and waddled awkwardly up the igloo of tangled sticks, her broad tail trailing firmly as a bracer.

In groping around with one large hind foot, she missed her footing and in order to regain her balance she reached down to grab a stick with one forepaw. Naturally, some of the mud dropped. Carrying the remainder of the load farther up on the house, she deposited it and kneaded it in between the sticks with her small forepaws. Whereupon she returned to the spilled part and kneaded it in place before descending. A beaver keeps its mind on its work.

With wavering, faltering steps she managed to carry the next load almost to the top of the house, when, stepping on an insecure stick, she lost her balance completely. The mud plopped down as she tried to grab a pole with her hands. But gravity had gained the upper hand and nothing could save her from falling. Realizing this, she drew in her feet, closed her eyes, relaxed and seemed to enjoy the ride as she bumped over the jagged sticks and splashed into the pond, belly up. Rolling over gracefully—gracefully, for now she was in her element—she dived for more mud as nonchalantly as if the Humpty-Dumpty method were a regular way of descending from the roof. After patting in the new load, she proceeded to the spilled one as she had done before, and tightly patted it in. Interruptions do not cause a beaver to forget what it is doing. Only the apprehension of danger will make it give up, once it has started a task.

During the first weeks of harvest others took turns at plastering and by the time the aspen leaves were falling the whole house was covered with mud, except for a patch on the roof. There the poles were carefully left unplastered for ventilation, admitting the only air the beavers would have when ice locked the pond and held them prisoners from the outside world.

Not until the first frosts had colored the leaves did the beavers begin cutting and hauling willows, alders and aspen trees, and anchoring them under water in a food

© WENDELL CHAPMAN

CLEANING UP THE LEFT-OVERS AFTER CUTTING

A beaver gathering up the odds and ends. Loads of wood and roots are grasped in the teeth for carrying. Loads of mud are held in the arms under the chin

pile just outside the lodge. They had to look ahead, as this would be the only food they could reach after the pond froze over. Probably the tree bark, which furnishes the winter food, is not suitable for storage until the sap has gone down. But after the leaves had turned red and yellow and had begun to fall, the beaver colony started the harvest in earnest.

Most of the trees near the water had been cut in former years, and the long trips into the remaining groves were made by the four adults only. The pair of kittens and the three older youngsters busied themselves about the pond, often towing branches to storage which the adults dragged from the forests. They gazed longingly at their elders, who arose at the pond's edge, shook the water from their coats and waddled up the long runways into the mysterious groves. Bears and coyotes were numerous in the district and had sent the loggers scurrying to the pond on several nights. Because of these dangers, and possibly because of our presence, the immature beavers did not venture far ashore.

On many occasions we saw examples of the neighborliness of the beavers. One evening an adult sat working on a rock slide upon which a tree had been felled. A cony and a meadow mouse, diminutive creatures, ran about at the feet of this towering beaver. As the beaver stretched over or leaned under the prostrate trunk, supported by the bent limbs, the cony and the mouse darted fearlessly near to pick up the shavings flicked from the beaver's mouth. These chips would make excellent bedding for the smaller creatures. The beaver, stopping to listen for possible enemies, paid no attention to the midgets skipping, with unconcern, about at his feet.

While other beavers were swimming nearby, a mink dodged and slithered through the tangled sticks of the house, in search of a small slate-colored bird that had taken shelter there. At the main lodge, beavers surged beneath the surface with their loads, tugging and shoving them into secure position, while two muskrats, unmindful of the commotion a few feet away, sat preening on a log which bobbed about on the beaver-made waves above the doorway. Ducks scarcely moved aside when the beavers swam with their loads or returned to the grove. Fish jumped for bugs within a few feet of the peaceful loggers. A huge moose feeding in the pond and a tiny weasel searching on the shore for conies or mice were equally at ease near the plodding beaver.

No other native animal that is strong enough to intimidate others is any more peaceful than the beaver. He never eats fish or flesh and his pond is a refuge for any bird, fish or friendly beast that wishes to use it while the beaver is there. In fact, animals who come to prey on him are not disturbed, the beaver merely reporting their presence to the rest of the colony by a vigorous tail slap on the water and thereafter retiring to the seclusion and safety of his lodge.

After the beaver can no longer find food near at hand, having cut all the trees and willows and dug all the roots which are suitable for food, he abandons the pond. Then the dam, no longer repaired by this tireless worker, releases the water from the pond. In a year or two the rich soil, which the dam checked from washing to the sea, forms the richest of meadows or cultivated fields. The beaver is not only a peaceful neighbor, but his good influence is felt where he has lived long after he is gone.

●

Many readers have submitted photographs to the Rotogravure Editor in response to the announcement of awards to be made for outstanding pictures. Photographs submitted between now and November 15, 1935, will be considered for the next series of rotogravure sections. Pictures must be Nature pictures from which will be selected the Nature Picture of the Month. Other usable photographs will be purchased and used.

Further details of this award will be found on page 69 of this issue.

BAD BOY

The story of an interesting hawk pet

By FRANK AND JOHN CRAIGHEAD

"BAD BOY"

BAD BOY was a male sparrow hawk who first opened his eyes in a snug hollow of a huge sycamore tree. In this respect, he was no different from hundreds of others of his kind. But when only two weeks old, with scarcely a trace of feathers, he was taken out and lowered in a basket from his home. Two of his sisters, looking like small balls of snowy white down, accompanied him to his new home, in a warm cardboard packing box, situated in the sun parlor of our house.

The first meal the young hawks enjoyed with us consisted of beef, liver and finely ground greenbone. Young hawks must have plenty of food, especially bone and liver, if they are to grow feathers that are not cut with hunger streaks, and legs not bent with rickets. The young hawks were fed three times a day, at first by opening their mouths and stuffing the food down. In a few days they ate of their own accord. The little male hawk soon earned the name of "Bad Boy" because he was incessantly escaping from the box, and then sinking his sharp claws into our hands as we endeavored to return him. In about a week's time the hawks attempted their first flights of a few feet, sometimes from the edge of their box and sometimes in their attempts to catch grasshoppers. By the twelfth day of their captivity they were making flights of one hundred feet, and in three weeks they were practically fully feathered with long graceful wings and tails.

COOPERATION BRINGS RESULTS
Bad Boy has caught a mouse and Spike inspects it and gives it his approval

Then it was time to begin training them, an easy matter with a young sparrow hawk. Food is held in the trainer's hand while the hawk is placed on a nearby perch and induced to jump or fly to the hand for food. Bad Boy and his sisters were such apt scholars that in six days they were turned loose for their first long free flights. After circling around our heads for a few minutes, and exploring the trees, they one by one came back to our whistle, which was given while food was held on the hand. The little male was the most dashing and picturesque flier but no faster than the females. All could and did catch locusts and sometimes even dragon flies on the wing, which act later led to the loss of the two females. A small lure was prepared for the hawks to teach them to hit a moving object in the air. This was a small weighted block of wood covered with red flannel to make it easily discernible. A small snap allowed meat to be attached to it.

When calling the hawks, the lure was thrown high in the air, and the minute one of the hawks caught sight of it he would dive, catching it in his talons, his reward being the bite of meat tied to the lure. Because the female hawks could catch and car-

ry a lure equal to their own weight, a heavier one had to be made for them. One of the female hawks, on her first try, caught and carried the light lure into a honey locust tree. One of us had to climb the tree and recover it.

For protection, the hawks are tied to their perches by long leashes at night and when not being flown. One evening during the summer we were untying the hawks to take them in the house. A thunder storm could be seen and heard in the distance. By accident Bad Boy's leash was dropped and with a few swift strokes of his wings, he was perched high up in an old ash tree that overhung the creek. He tried to come in response to an offer of meat and a whistle but the leash was caught around a small twig. It would never do to leave him up there unprotected and helpless in a storm. So it was solved by climbing the tree armed with a ball of cord and a paper bag, stuffing the hawk protestingly in the bag and lowering him to earth. He was soon perched with his sisters on the window sill, where they watched the wind-driven rain flash past. Bad Boy disliked heavy wind and rain but enjoyed short showers. In the summer he was particular about having a bath at least once a day. When taking a bath he would duck clear under water, getting so soaked that he could hardly fly back to his perch.

Bad Boy always returned home and lit on his perch after a flight of three or four hours. This habit grew with him until he could be let loose for a day or two. We knew that he would come back for food or a bath. In the winter he was fed all he could eat twice a day, but he came back not for food but for company. At the first sign of darkness, usually just as the sun was setting, the little fellow could be found either on his perch or within arm reach on a nearby tree, waiting to be taken into the house, there to perch on the dining room door while we ate supper. Often we would take a small piece of lean meat and throw it to him. If he was hungry he flew off and caught it in the air, otherwise, with a well-timed grab, his little claws would shoot out from under him and snag it as it passed. He was so quick that he could catch a piece of meat nine out of the ten times it was thrown to him.

MOST HAWKS INSTINCTIVELY FEAR DOGS
But Bad Boy was different and he and Spike were the best of friends and playfellows

When Bad Boy was in the house we got in the habit of calling him by name, and he soon learned to answer to it from near or far. His reply was either a series of low chipping notes or a harsh guttural note rapidly repeated. He gave his "killie-killie" scream only when frightened or proud of some newly performed feat. At times when most of the family were out, and the house was quiet and lonely, we would hear a flutter of wings and look up to see Bad Boy perched on the back of our chair. He wanted companionship. At such times he always tried to play and would go through all kinds of acrobatics to draw attention. He would preen his feathers, stretch his wings, stab out a little talon in lightning-like grabs, play with a button, or jump back and forth from chair to shoulder.

One morning, after letting Bad Boy loose to get a little exercise, we glanced out of the window to see if he was still around. Fluttering across the ground was what looked like a bundle of sparrow hawk wings, tails, and claws. At first we thought Bad Boy had caught a bird, but instead of one sparrow hawk's head and tail, there were two. Bad Boy was in a fight with another hawk, perhaps getting the worst of it. Out of the back door we went. Bad Boy was flat on his back, his wings spread and his claws fastened in his adversary. When the wild hawk saw us, he let go

THE AUTHORS AND THEIR PETS
Yes, they are twins, and live in Washington, D. C. Ye editor is not sure which is which

and attempted a getaway, but Bad Boy held him, stubborn as a bull dog. With a final tug, the invader succeeded in freeing himself just as we reached for him. Bad Boy ruffed his feathers several times. A few fluttered to the ground, but otherwise he seemed to have fared well. His appetite was not affected, for he jumped to a hand expecting food.

When Bad Boy was free and especially hungry the instinct for killing would dominate the tame, docile little fellow. He would then chase sparrows, and, in turn, be pestered by the bold, screaming bluejays. They seemed to know that they were a little too big for him to tackle, and would fold their wings and dive at him, just touching his back as they zoomed up. They always lit on a branch just above him, and then repeated their diving and screaming. He would stand for this treatment just so long, and then with a quick spurt he was after one of them, and in a few powerful strokes of his wings he was up with it. He usually succeeded in raking the back feathers off the jay, thus driving the noisy mob in a quick and hurried retreat. There was always a thrill in this.

BAD BOY'S SISTERS

The wild called and they flew away. Below the three hawks on their perches waiting for the lure to be thrown

One day while in a killing mood, and finding no sparrows to chase, he decided to feast on the neighbor's canary, but did not realize that a glass window separated him from his prey. He hit the window with a terrific bang, and fluttered to the ground. He was a stunned and surprised bird, but the poor canary was twice as scared. Bad Boy never attempted to catch the canary again in this manner, although several times he lit on the window sill, peering in at the terrified bird and trying to figure out how he could catch it.

That Bad Boy used his head to think with seems proved by one incident. The thermometer had registered from eight to fifteen above for about four days. During this time we had not let Bad Boy out for fear he would freeze to death. He was getting restless so we decided to turn him loose for a short flight. At first he had a great time flying in the wind but gradually the cold began to get the best of him. He lit on a tree and began to shiver. We thought it was about time to call him down, and went into the house for food. When we came out he was perching on the edge of the ventilating pipe of the house next door and would not come down. The hot air coming up the chimney warmed him and no manner of coaxing could bring him down. He drew one foot up and began preening his feathers, so there was nothing to do but wait for dusk, when he would come back. We let him out every cold day after that and he seldom perched anywhere but on ventilating pipes.

When he was given more than he could eat, he would hide the remaining food, just as a dog hides a bone or a squirrel a nut. He always remembered where he hid it, and it was his first objective on being slipped of his leash. He hid little pieces of beef all over the house, to the annoyance of mother and the delight of Spike, when that hound chanced to find a piece hidden in some remote corner or behind a chair or table.

Most hawks, in fact all the other species that we have trained, are instinctively afraid of dogs. The sparrow hawks proved an exception to this rule, but especially Bad Boy. He and our dog Spike are good friends in spite of the fact that Spike is sometimes jealous of the attention paid to the little fellow. Spike learned that when Bad Boy gives his "killie-killie" scream something is wrong, and nine times out of ten it is a stray cat attempting to get a good meal. The minute Spike hears this cry, he goes tearing out to the back door and around to Bad Boy's perch to try and punish the intruder. The hawk thinks nothing of making a flying landing on Spike's back, and riding across the room. Many times when Spike would get too rough in his playing Bad Boy's foot would shoot out and rake his nose, causing him to jump back with surprise and not a little pain. Often both dog and hawk can be seen eating their meals together under the kitchen stove and not more than a foot apart. Spike eats his own meals and sometimes manages to sneak a little of Bad Boy's on the side. He never succeeds in this, however, if Bad Boy is at all hungry, for the little fellow stands up for his rights, and Spike is forced to respect them.

A sport equally enjoyable to Spike and Bad Boy was chasing and catching mice. The mice were found under the long standing wheat and oat shocks. Spike sniffed all around the shocks until he came to one that contained

mice; then he rooted his way under it, chasing them out the farther side into the stubble. Bad Boy, perched on top of the shock, immediately pounced on one of the unsuspecting mice. We would let him eat a little, then take it away so he would be hungry enough to catch more. The teamwork exhibited between the two was economical, because they caught enough mice to feed all our other hawks.

Bad Boy will have a hard decision to make when spring comes. His wild instinct will call him away to find a mate and make a home for himself in some hollow tree, and yet his whole life will urge him to remain where he is fed regularly and assured of safety, shelter and freedom. You may be sure he shall have his choice but we are inclined to think he may decide to board with us a little longer.

•

Loon Sagacity

By GEORGE H. BURROWS

MAURICE O'SULLIVAN in *Twenty Years Agrowing* expresses the view that the loon builds no nest, uses none, but holds and hatches her eggs while afloat on the water. If this means that the nest of the loon is rarely found, our triumph in discovering one is heightened.

During four mid-July days we were camped on the shore of Moose Cove Lake, Nova Scotia, several miles inland by devious water ways from Salmon River Bridge. The morning after our arrival, a pair of loons attracted attention by their interest in a marshy spot at the edge of an island a quarter of a mile off shore.

While the birds were away, we rowed to the island and there found the nest, a well-formed structure of twigs and grasses. About two feet across at the base and built in two inches of water, its rim extended four inches above the surface. At the center of the nest, and slightly below the rim, were two large, lustrous, dark-brown eggs. The floor of the nest was moist.

Prompt return of the birds after our brief visit and their increasing tolerance of us as neighbors justified a second visit to photograph the nest and eggs. This accomplished, the island thicket commencing but a few feet away suggested cover for a snap shot of one of the birds on the nest. Attempts at stalking through the thicket, though as stealthily as possible, disturbed the birds. So I concealed the focused camera, carried well inland a long string attached to the shutter, and left the island. The birds went to the nest immediately. By a circuitous route I returned, reaching the string's end unnoticed.

The shutter's click and the resetting of it for a more promising exposure gave me away. I retreated to a point of the island quite out of sight and sound, but the loons stayed from home. I discovered them just off that far shore of the little island. They were watching my boat, quite obviously realizing that it meant I was about. For once their concern and mine were evidently the same, that the eggs might chill through my trivial interference. The moment I pushed off, they swung around to their side of the island and resumed housekeeping.

The Sand Dunes of Indiana

By C. H. ROBINSON

Photographs by the Author

A STRANGE, seemingly misplaced and intriguing place is that twenty-mile strip of land, a mile to a mile and one-half broad, that surrounds the southern end of Lake Michigan and embraces the sand dunes of Indiana. When were the towering sandhills built up and whence comes the sand, is an often repeated question. The visitor, seeing the sixty-foot ridge that borders the beach, the conical or dome-like sandhills farther inland with their interdunal valleys, heavily forested flats, marsh meadows and quaking bogs, may well wonder about the story of their origin.

Geologists agree that the region surrounding Chicago and the northern part of the United States was, for a period of years counted in millions, subject to recurrent advances and retreats of immense glaciers of great thickness. Moving slowly but surely in a southern direction, they levelled hills, filled valleys, lakes and rivers, ground solid rocks to sand or left them as boulders, and otherwise completely changed the face of the regions over which they passed.

The name given to the last of five glacial invasions is the Wisconsin Glacier, to which most of the present surface conditions are due. The front of this covered but a small area in the northwestern corner of Illinois; then, in an irregular line south and east, its base covered the north half of Indiana, Ohio and northern Pennsylvania, where it halted, gradually melted and passed away. It left along its course small ridges of sand, gravel, pebbles and boulders that are called "moraines."

ONE OF THE MOVING HILLS OF SAND IN THE INDIANA DUNES

Vegetation is seeking a foothold, but until it succeeds, the dune will move on and on before the northern winds

WHITE TRILLIUM OF THE DUNES

More than three hundred flowering plants native to this area are found in varying profusion

As the Wisconsin Glacier slowly melted, a large freshwater lake or sea was formed that included all the bodies of water now known as The Great Lakes. As the ice melted the rising waters found additional outlets during the many years Lake Michigan was receding toward its present level of about six hundred feet above the ocean tide. Its beach, which, after considerable subsidence of the surface, was several miles north of the Valparaiso Moraine, has been named Tolletston Beach, which extended in an irregular line from Winnetka, north of Chicago, through Evanston, Chicago and the three northern counties of Indiana. The old elevated shore is plainly marked just south of the Dunes Highway between Baileytown and Tremont stations on the Electric Railway.

During the years—estimated at ten thousand or more—while this beach was the wave line of the lake, the water at its front on the tract under consideration was shallow

THE LARGE WHITE POND LILY

In the ponds of the dunes these may be found, adding their delicate beauty to the dark reed-studded waters

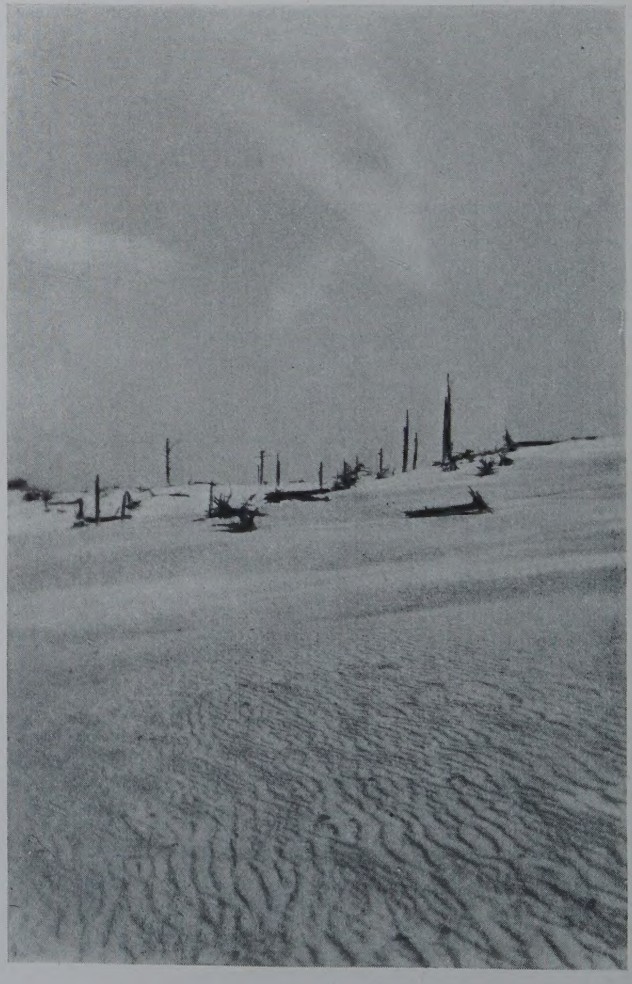
and continually losing depth as the lake surface receded. The prevailing north winds brought sands eroded from the steep shores north of Chicago, carried them by currents to the south end of the lake and deposited them as parallel sandbars off shore. As soon as these were raised above storm line, vegetation began upon them; weeds, shrubs, vines, and cottonwoods and other trees grew apace and soon formed barriers to halt the beach-blown sands.

These forces, in time, built up the first line of the dunes—the irregular ridge of more or less timbered sandhills on the north side of the low valley. This ridge was the first of the dunes, and those now between it and the lake are much younger. In the deeper channels between this ridge and the present beach, the currents prevented the formation of sandbars and they were left as lakelets, ponds, and marshy meadows, their surplus water discharging into the lake until the accumulation of peat and vegetable decay raised their beds and made most of them nearly or altogether dry.

Many changes, however, in the contour and number of the sandhills have occurred in the many passing centuries. In the lake ridge, which slopes steeply to the wide sandy beach, winds have undermined trees here and there. These have fallen down the slope, leaving openings called "blowouts" through which the north winds have carried sand which spread fan-like, filling the ravines, burying the low ridges and forming high plateaus of nearly bare sand, some of which are many acres in area. Over these the sands have drifted toward the south for many years, ending in steep dumps down which the sand descends daily and nightly, continually extending their bases into the flat or forest. At the base of one of the largest blowouts, when my visits began, there was an old woods road used as a foot path; now it is far back under the body of the dune.

Until a dune has become fixed by growth of trees and other forest vegetation its continuance is uncertain. The winds tear its bare sides to build up another sandhill beyond. In the centuries since the first of the dunes were formed, many have disappeared, new ones have been formed, the summits of some of the highest have been lowered, and the process of change is still going on. In the ages to come it is not unlikely that the encroaching sands will trespass on the low valley to the south of the Indiana Dunes.

More than three hundred blooming plants are native to the Dunes region. Excepting the skunk cabbage, the earliest bloom to be expected is the trailing arbutus, which



A CEMETERY OF THE TREES

Foiled in their attempt to gain mastery over the shifting sands the trees have died and now leave the sand to be carried inland on the winds

THREE OF THE FLOWERS FOUND IN THE INDIANA SAND DUNE REGION

At the left is the New England aster; in the center the showy lady's slipper, one of several species of orchids; at the right the Turk's cap lily

often appears at the edge of a belated snowdrift. Its light-brown, rough stems creep along the ground under the brown forest leaves. Its light-green leaves—rough and hairy—may have rusty spots, but new ones will replace them in June, and its sweet-scented, five-lobed, tubular, small, pink and white flowers, with a frosty sheen, delight the soul of a flower-lover.

About the same time one may find three-lobed green leaves peeping from and parting the dead forest leaves. A red, fuzzy flower stem will be seen springing from the root, with its reddish bud protected with a woolly cover until a few warm days will permit its beautiful flower, nearly an inch wide, to open. The general color is lilac with darker stripe, but it is not uncommon to find one plant having light lavender, and others pink, white and even blue. It is a native in most of the states, and everybody knows hepatica.

Beginning with the warmer days of April, the woods soon become bright with blooms of many colors. In the shallow woodland ponds, the marsh marigold—acres and acres of it—gilds the dark woods with its golden color. In the same woods are wide patches of the so-called dog-tooth violet in two varieties, yellow and white. The most beautiful is the yellow, but both are identified by two large pale-green leaves mottled and spotted with dark purple. At the same time we may find two varieties of anemones, the wind flower and the rue-anemone, wild geranium or cranesbill, and many other early flowers. A little later the woods are white for miles with several varieties of trilliums.

In late May or early June, orchids of many varieties begin to bloom. First the yellow lady's slipper—small and large. In early July the moccasin flower, the small white and the large white or showy lady's slipper, the finest wild orchid in North America, with its blotches and stripes of magenta, brighten spots in the boggy swamps. Surely Nature has been kind to the moist places.

In early June the dwarf wild roses begin, and one may walk for miles without being long out of sight of these charming flowers. There are three varieties, one each of light and bright pink and with the usual five petals. The third is a rose new to botany, which the writer had the pleasure of discovering in two small colonies. The plant is dwarf, leaves small, flowers solitary, two inches broad and all have thirteen petals, bright cerise in color. The American Rose Society, to which I sent blooming specimens, became interested, appointed a committee to determine its newness and on its report gave it official registration as The Captain Robinson. So far as known, it is to be found nowhere except in the Indiana dunes. There are at least four of the larger roses, including the *Rosa blanda* or smooth rose, and three of the swamp roses, two kinds of which grow in the rich, damp soil, reach twelve feet or more in height and bloom in August and September with clusters of flowers to the top.

We must not forget the lilies of the dune region. Beginning about the last of June or early in July, we have the red wood-lily that is found in small colonies in several places, but is more plentiful in what we call the Long Meadow, where several hundred of them bloom in favorable seasons. Its tall stem has leaves in whorls of five, and above these are two or three flower stems bearing single flowers. The petal-like sepals are orange-scarlet, freely spotted with purple; the flower cup opens nearly erect and is the only wild lily that does not droop or nod; its sepals narrow toward their base to slender stems.

Late in June and early in July we have the yellow meadow or Canada lily, which is fairly plentiful in the open woods. Its growth is much like that of the wood-lily, except that its whorls have six leaves. Above the whorls it may have several flower stems. It is orange-red

or red-orange in color, drooping or pendulous, the sepals turning well back and spotted purple-brown on the inside.

But the Turk's cap is surely the most beautiful of the dune lilies, and in some seasons is abundant. I have seen more than a hundred on an area of a few acres, many of the plants having as many as twenty buds and flowers. Its light-green, stout leaves are not in whorls like others, but crowd the stem, usually opposite to each other but alternate on the flower stalks. The flowers resemble the Canada lily in shape, but the petals are wider, longer, and curl farther back, exposing the long stamens with large anthers at the ends. It is the latest of our lilies.

Among other dune attractions to the flower-lover are the flat-leaf cactus, many varieties of asters, goldenrods and water-blooming plants in the ponds. There are, also, many flowering shrubs and trees. The small yellow flowers of the spicebush and white tassels of the shadbush or serviceberry are the earliest of these, closely followed by the many wild cherries and crabapples; later the tulip trees blossom. The beach above the wave-line is white with the blooms of the sandcherries, and the hibiscus, or swamp rose mallow, may be found in the shallow still waters of the small creeks.

The Indiana dunes are certainly Nature's botanical garden, worth a visit from any lover of flowers.

•

Camouflaged Snails

By P. A. MORRIS

In the tropical seas of China and Java lives a marine snail with a most peculiar habit. Early in life it fastens a small pebble or bit of shell to its back, placing it just back of the aperture, on the outer edge of the shell. As the snail grows, this bit of shell or pebble is firmly anchored in the shell, and another piece is picked up and placed in position. This results, as the animal grows up, in a spiral of foreign material following the suture lines of the shell, the purpose of which is apparently concealment.

Evidence that these mollusks are capable of exercising choice in the selection of their camouflaging materials is shown by the fact that while some individuals use pebbles and others shells, the same snail never uses both. The bits of shell are so disposed as not to curve downwards beyond the edge of the shell, which would impede the progress of the animal, but are usually placed with their concave sides uppermost.

The generic name of this interesting group of snails is *Xenophora,* meaning a "carrier of strangers," and fossil specimens are found as far back as the Cretaceous period, showing that this curious habit of self-ornamentation has persisted for countless thousands of generations.

ANCIENT AND MODERN VERSIONS OF AN ODD SNAIL

The upper three figures are dorsal, lateral and ventral views of a recent specimen from Java; the lower two a specimen from the Miocene Age, 25 million years old

GIANTS OF HORNET LAND

By A. B. CHAMPLAIN

NOTICEABLE increase in numbers of the great European hornet and its spread over new territory have caused it to become a subject of general interest. This insect, decidedly larger and more fierce in appearance than our native hornets, was introduced into the United States some four score years ago. It is now apparently well established along with our native species.

At our shack in Clark's Valley, *Vespa crabro,* as the European hornet is scientifically known, settled in a big way. A large sour gum tree that stands in front of the camp was chosen as a citadel during last summer. The opening leading into a hollow cavity about forty feet above ground was the point from which these industrious depredators sallied forth bent on the questionable business of the colony.

During previous years other tenants occupied this aerial apartment and were it not so close to the camp, a family of raccoons would, no doubt, be denning in it ere now. Black snakes have played up and down the rugged bark, surprising us with their ability to negotiate the vertical trunk; and the blue-tailed skinks spend their time between this tree and the cabin when the sun shines brightest.

THE EUROPEAN HORNET, ENLARGED

Recent increases of this insect in localities has aroused interest in its habits, both good and bad

This was the rendezvous of our giant hornets. Every day from their "tree-top tall" they would forage about the clearing and surrounding country, enjoying the world as they found it. They would hunt for food to supply their young and for themselves, and collect the substances with which to continue the building of the nest in which the broods were raised. Fortunately, the giant hornets were too busy minding their own business to bother about stinging man or beast. However, had their nest been disturbed they would have been sure to overstep these bounds of good fellowship in regard to other neighbors. Nevertheless, we observed and spied upon them throughout the season.

Architects of no mean ability, they built nests similar to those of the common hornets, although the cells were much larger. However, the workers seemed to select as building supplies softer and much less tough materials. They frequented areas where seasoned wood, decaying logs or stumps and standing trees with flaky bark were available. Here they scraped and tore off portions suitable for the work in progress. They then carried this load with unerring precision, no matter how far, back to the nest. Here each worker proceeded to that part of the nest where additions were under construction. Chewing up the pellet, the artisan mixed it with the gummy secretion from the glands in her mouth. Then she proceeded literally to spread it thinly along the edge of the growing structure. This formed a yellowish or russet-colored paper, not lasting in quality, but which constituted the comb.

When the nest was begun, the hornets first attached the comb to the upper part of the hole or cavity by means of a large mass of wax. This was the supporting column. Then, as the colony expanded, a second comb was added beneath the first and fastened by pillars of wax. This was continued, one above the other, as required for the growing habitation.

The paper nests of the European hornets are more often built in hollow trees. But sometimes these giants of waspdom are not averse to occupying the corner of a building, or constructing their combs beneath the eaves or projections of a roof, or under the thatch. It is in these latter instances, when the hornets become a decided nuisance, that methods must sometimes be devised for their eradication.

Out in our mountain camp the hornets proved interesting entertainers. We learned that not being satisfied with working all day, many of them were abroad at night. It was during our hunt with flash lights for night-flying moths during August and September that we discovered this. At the base of a wounded and bleeding oak, they belligerently chased away the other creatures attracted to this fountain of sweets. While some of the hornets were already industriously working about the sappy wound,

others came or went through the dark. When our lights were played upon the scene, about a dozen buzzed or hummed their defiance. Into the air about us they circled, dashing against the front of the lamp and bumping into us as the glare blinded or attracted them. Their activities became so persistent on several occasions that we were forced to surrender the ground and retreat.

It is known that the giant European hornets labor during moonlit nights seeking their prey, but we observed that even on the darker nights they were abroad. The window of the shack, where our mosquito netting screen with the kerosene lamp behind it formed an ideal lure for moths and other insects, also proved an attraction for the hornets. Were they drawn there by the light rays or were they, too, collecting choice tidbits among the other specimens congregated there? Even late at night we could depend on hearing one or two belated individuals humming querulously about the eaves or windows after the lights were out and we had retired.

During daylight they were about the place at all hours. We observed them sipping the "sweets" from a bleeding tree, or, again, chewing the bark from succulent twigs of favorite varieties. And here we might comment that nurserymen and gardeners complain that ornamental shrubs and other valuable plants are often ruined by the girdling habit of the giant hornets.

Among our forest growth were some seedling apple trees, planted years before by accidental means. These trees yielded some curious varieties, some of which were pleasant and provided food for ourselves, for the wild rabbits who discontinued their depredations on our favorite annuals when the apples ripened and fell, and for the deer. The giant hornets, buzzing about among the tree-tops, soon learned to select the ripening surface of the choicest fruit as a delicacy not to be despised. They chewed holes into many of the larger apples in a way that was anything but agreeable to us. Orchardists frequently find quantities of fruit thus disfigured and ruined.

To compensate for all this, however, we find that *Vespa crabro* is, after all, a useful insect. Let us examine the European hornet from its most ferocious aspect. Humming or buzzing about among the flowers, the herbage and along the trails, they search for prey. This time it is fresh meat that is desired.

On September 9, we observed a kill. One big amazon sailing down among a mass of low herbage led us to investigate. There was a commotion amidst the tangled foliage, "growling" and swaying that one could hardly believe possible for an insect to make. Vespa had seized a grasshopper as large as herself and had dragged it to the ground. Tearing it piecemeal, with legs, wings and other grasshopper appendages strewn about, it bore the body triumphantly away into the air.

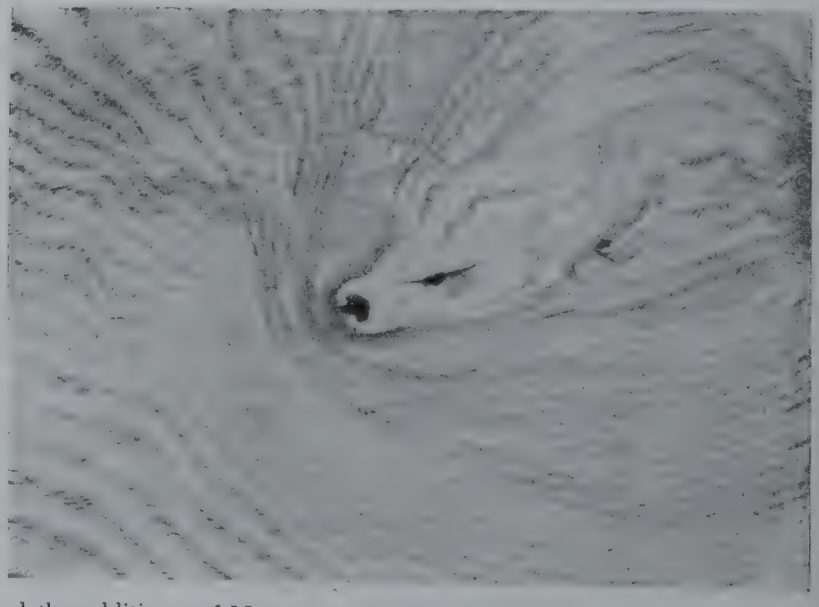
The principal food of the European hornet consists of other insects. These giant hunters destroy myriads of man's insect enemies, which, in general, more than compensates for their damage in other ways.

Vespa crabro may be distinguished from the other species of hornets and yellow-jackets by the deep russet color of the head and front part of the body. Black and yellow markings also adorn its hairy form. Its generally fierce demeanor and apparent strength give it the distinction of being one of our most formidable-appearing insects. The broods of this species, similar to all other hornets, are fleshy grubs and have to be fed by the workers. The nest is begun by the "queen" or mother, who is generally considerably larger than the ordinary workers. She survives the winter in the adult stage, sheltered from the frost and winter chill, in some snug retreat such as a decaying log or beneath bark. During the hibernating period, she is in a torpid or dormant condition from which the magic rays of the spring sun awaken her.

•

"Dogwood"

By W. M. REYES



AFTER the saw and plane had done their work with this piece of wood it was discovered that Nature had been trying a little free-hand drawing and produced a creditable picture of a dog swimming. Ripples, the swirl of water around the dog's jowls and even a fanlike wake behind them are all represented. Many such surprises are given to the observing lover of the outdoors. Many of us stroll through country or city park with unseeing eyes, but one of the greatest developers of observation is the camera. Equipped with one, and a desire to record the oddities of Nature, many and varied subjects will be discovered.

"No one dares call me poor
Or say wealth is not mine,
When waiting just outside my door
Are blossoms on my vine.

I own the wide expanse of air
The strong exulting sea
The peace of mountain sides I share
The world belongs to me."

BRECK.

• • •

The Cruel Vine Our Grandmothers Loved

• • •

By IAN THOMPSON SMITHERMAN

A HANDSOME VINE FOR THE PORCHWAY
The cruel vine deserves popularity because of its beauty and hardiness

ONE OF the many bewitching old climbers that used to festoon the verandahs and gateways of our grandmothers' homes was the ancient cruel vine or flycatcher, which does not achieve today the popularity it so richly deserves. Its soft, grayish-emerald foliage and handsome, glistening blossoms used to make beautiful both cottage and mansion, and its hardiness and self-reliance gave it a favorite place in the hearts of the hard-working women of an earlier age. And there are signs to indicate that it may yet again become a loved and much-used plant.

Its pure-white, cup-like blooms closely resemble those of the Clematis, but are much larger; only fresh orange blossoms can compare with them in beauty. They are borne on semi-erect stems about ten or twelve inches in length that droop just enough to make them ideal as cut-flowers for a centerpiece. But most beautiful of all are they in the moonlight, when a thousand and one of them glisten in the soft glow against the velvety background of the gray-green leaves.

The cruel vine is a member of the milk-weed family, and like most of its relatives very able to take care of itself. Once planted, it will live for a century or more, and many small seedlings will spring up around it each March. Zero weather is as nothing in its life, although a temperature of about five degrees below zero will kill it to the ground; but the next spring it quickly grows from the old root to bloom the same summer. Its only enemy is a small green bug, an aphis, which cannot survive an application of nicotine solution. Twice a summer my largest vine is sprayed with this emulsion at the time when the rose bushes are attacked by plant lice.

It grows most rapidly and its huge seed pods shower forth great quantities of seed, making it a genuine pleasure to pass them on to every garden lover in your neighborhood.

LARGER BLOSSOMS THAN CLEMATIS
Only the fresh orange blooms will compare with those of cruel vine. And the seed pods insure plants for the neighborhood

Each year of the long life of *Araujia serecifera,* or *bolivia,* as the plant is named, is packed with promised pleasures for you and your friends. From the time its first two huge leaves thrust themselves up through the warm earth in the spring until its almost evergreen foliage is struggling with the winter snows, it offers such rich rewards in beauty that its wane in popularity is a mystery.

Beautiful as is this plant, to the world of flies it is a dread menace. Lured by its fragrance, these insects descend, never to return, into the depths of the waxy cups in search of their magic; and the treatment accorded them has given the plant the name of cruel vine or flycatcher. This characteristic of the vine is, of course, tragic to the insects, but what householder would wish it otherwise?

•

Flowers that Never Open

By EDWIN D. HULL

ONE ordinarily thinks of flowers as opening wide to facilitate the visits of insect guests, yet there are some that never open at all. Such flowers are called "cleistogamous," meaning, with enclosed fertilization, the stamens and pistils never being exposed. Obviously self pollination occurs. Occasionally a flower is open or closed depending on environmental conditions, but there are species in which all or some of the flowers are habitually cleistogamous. Three divisions can be made. In the first the flowers are showy and raised well above the ground, but the petals tightly overlap and remain thus until they fall. These are the only flowers produced. Of this type a good representative is a globe tulip, *Calochortus amabilis,* of California, a member of the lily family. Bulbs can be potted in the fall and the flowers observed the following spring. Seeds are produced by self pollination and can be readily germinated.

In the second division are plants in which showy infertile flowers appear first, followed later by inconspicuous ones, which usually remain unnoticed until their stalks lengthen to facilitate seed dispersal. The best illustrations of this type are found among the violets, as in the common blue violet, *Viola cucullata,* a stemless species in which the closed flowers appear just at the surface of the ground, or in the stemmed violets, as *Viola conspersa,* where they appear in the axils of leaves on ordinary stems. In the third division aerial showy flowers are produced, and at the same time on underground stems the closed ones occur, without color, and hardly noticeable until the pods start to mature. An excellent illustration of this type is found in the milkwort, *Polygala polygama,* a plant found in sandy soil in the eastern and central states.

FLOWER EXAMPLES

Entire plant of milkwort showing open aerial flowers and closed ones underground. Upper right, closed flower of blue violet and, below it, closed flower of globe tulip

The effect of cleistogamy, of course, is to obtain a greater degree of potential reproductive power, since if one set of flowers be destroyed, the other may yet bear seed. For instance, the children might pick all the visible flowers from a patch of blue violets, yet abundant seed might be produced by the hidden ones.

•

Egg-Laying Snails

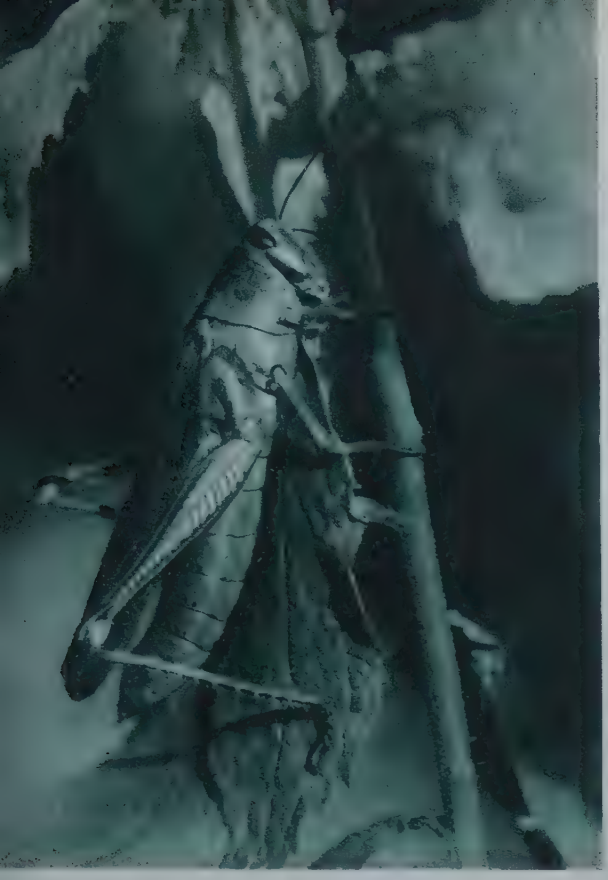
By P. A. MORRIS

IN South America there are several species of gigantic land snails that lay eggs which can scarcely be distinguished from those of birds. The eggs, which have a hard brittle shell of calcium carbonate, are laid singly and buried in the loose soil, usually about old stumps. The adult snails (some of which attain a shell length of six inches) are frequently seen in the markets, and the eggs are eaten too. A somewhat smaller species, *Strophocheilus oblongus,* is illustrated with its egg, with a robin's egg (above) for comparison. The snail's egg is three centimeters long, dead white, and less pointed than the bird's egg. This species inhabits the island of Barbados.

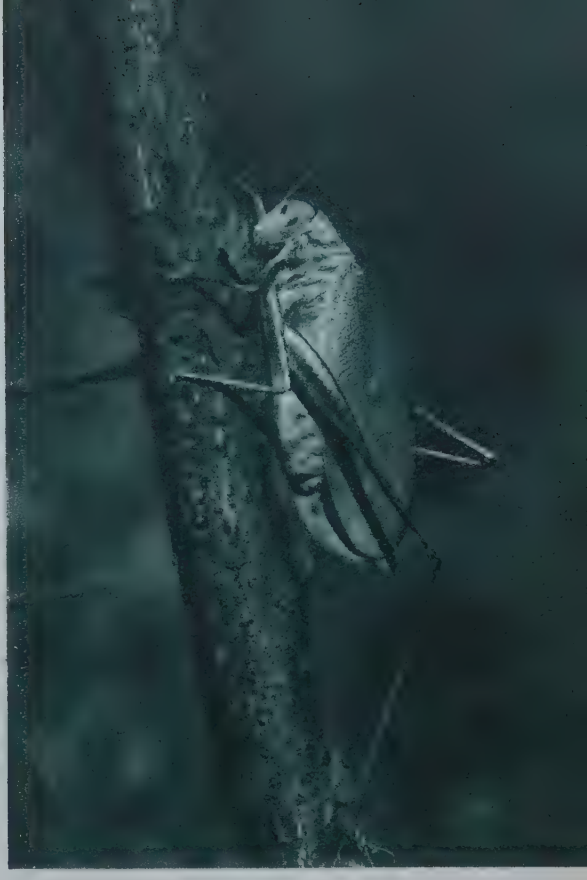
Heaven must be very near to this venerable shepherd as he watches over his fleecy charges on the mountainside of the Lower Engadine, Switzerland. Photograph by Feuerstein.

We find it difficult to keep from publishing new pictures of the charming little koala, or native bear, of Australia. There is something so lovable about these little fellows, who have suffered so much at the hand of man, that it makes one wish to set sail for Australia to meet them in person. Extensively killed in the past for their fur, the koala is now protected, and Noel Burnet is endeavoring to increase their numbers at Koala Park, Sydney.

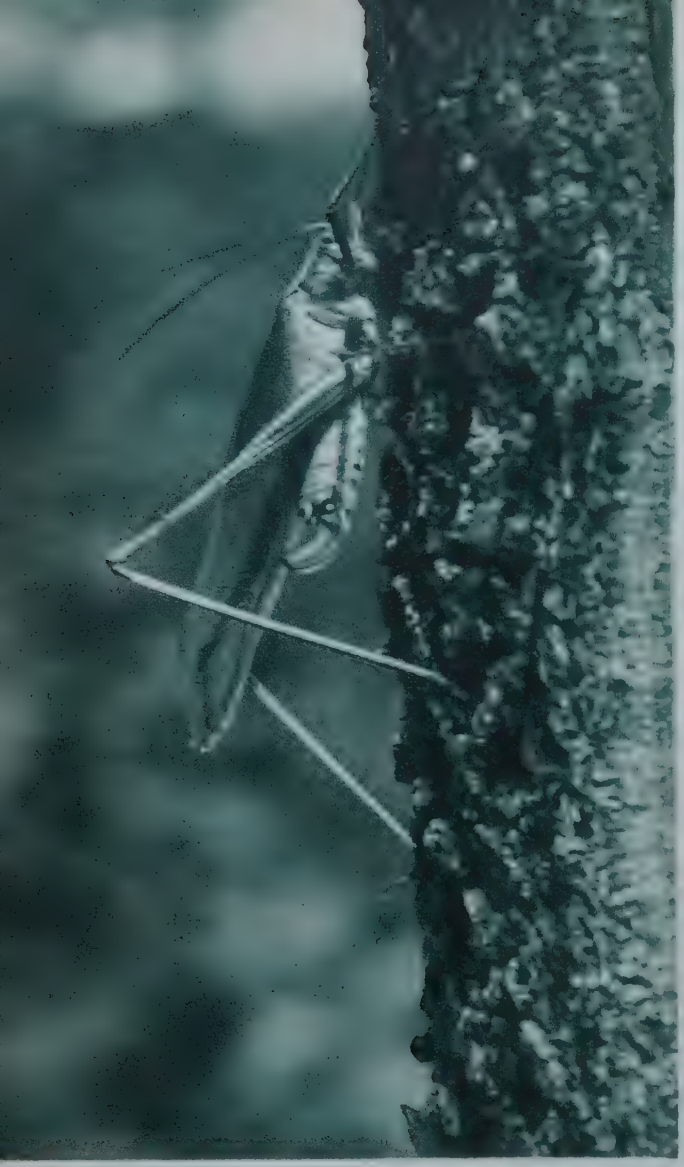
Below we see Mr. Burnet weighing one of the koalas as a check on its rate of progress. This little mammal lives on the leaves of certain species of eucalyptus, extracting both food and drink from them. They have never been successfully raised outside of Australia except for one or two fairly successful attempts in California, where it was possible to supply them with the species of tree they demand. There is a strict embargo against their exportation from Australia today, either alive or as fur.



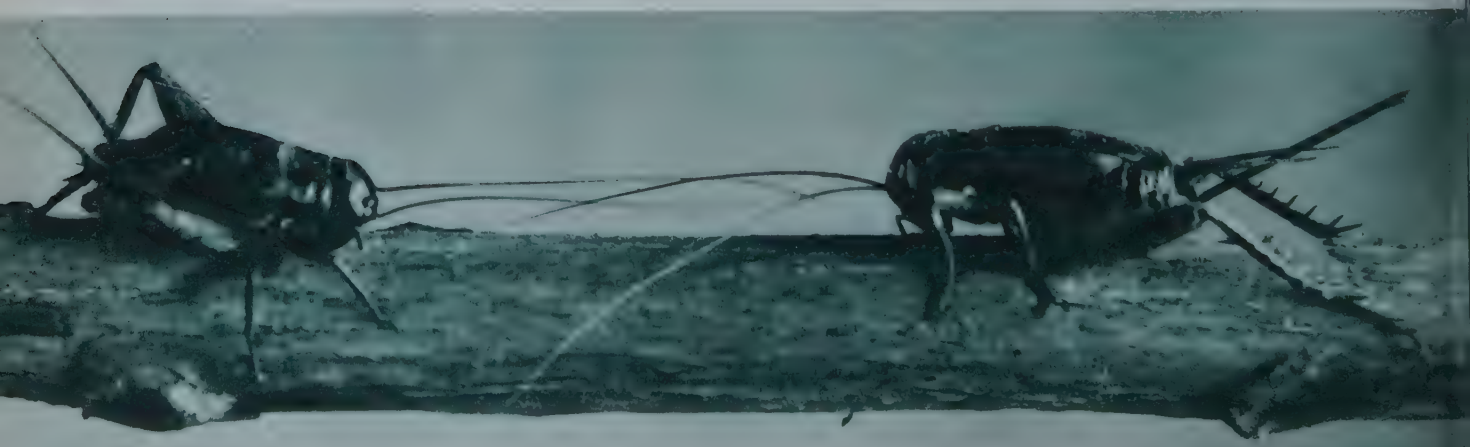
INSECT CHORUS



When the insect chorus swings into its summer song many will observe merely that "the bugs are certainly noisy". They would find it fascinating to meet the musicians personally and note the differences between them. One would no longer call them just "bugs", but would marvel at their ability at orchestration, for really they are more aptly to be described as fiddlers or drummers than choristers. Some of them rub their wings together, others rub or vibrate their wing covers. Among the members of the insect orchestra are the short-horned and long-horned locusts, two of which are shown respectively left and right above. Below, at the left, is a late-appearing locust with the Latin name of *Arphia xanthoptera,* and at the right is a long-horned locust, or katydid, on goldenrod. This fellow is a member of the same genus, although a different species, as his relative directly above. All photographs by L. W. Brownell.



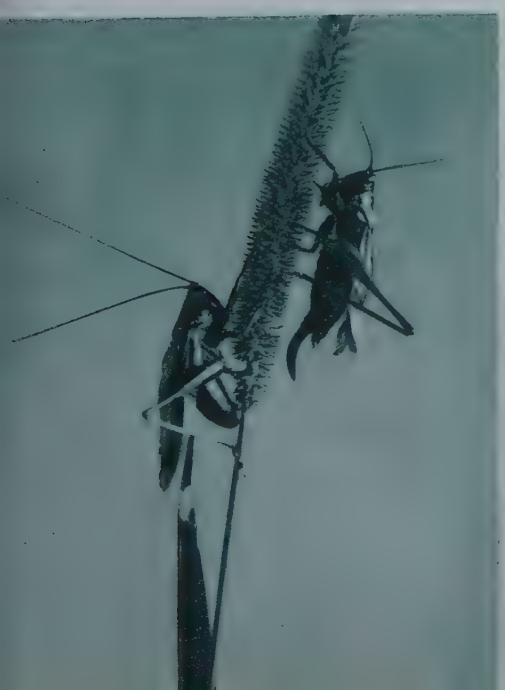
To the average layman, the differences between the various species of insects we are accustomed loosely to call locusts or grasshoppers probably will mean very little. In fact, they are probably chiefly of interest to the specialist and student. Yet by studying the pictures in this group we are able to detect obvious differences of structure. We might, however, make a mental note that the Family Tettigoniidae includes the long-horned grasshoppers and the famous but elusive katydid. Another name for this Family is Locustidae, which is unfortunate because there are no locusts, in the strict sense of the word, in it. There are sub-families to which *Conocephalus,* at the left above, and *Scudderia,* at the right, belong. Below are male and female field crickets; the family name is Gryllidae and this includes six sub-families. We advise those who wish to acquire a more intimate knowledge of these groups to provide themselves with a copy of Dr. Lutz's *Field Book of Insects.*



Some more insect musicians, and these are only a few of the whole large group. At the left is the tree cricket, usually distinguished by its pale green color that blends with its customary locale. The "song" of the males—who do all of the music making—differs somewhat with the different species. However, the tempo of their music is affected by the weather. One species—*Oecanthus niveus*—is called the temperature cricket because if we divide the number of chirps per minute by four and add forty we have approximately the Fahrenheit thermometer reading; or so they say.

At the right is one of the largest in size and strongest in flight of all our grasshoppers. This is a common species in our middle states; its Latin name is *Schistocerca americana*. It is often quite injurious locally.

Below, at the right, is the periodical cicada, or seventeen-year locust, clinging to a twig, while, below it, its empty pupa case is still in place. It belongs to a large family known as Cicadidae, and is incorrectly called a locust. The "song" comes from vibrating membranes stretched over a pair of sound chambers situated, one on each side, near the base of the abdomen.



In the two pictures at the left we see the contrast between the short-horned locust, above, and a pair of long-horned locusts.

You have, no doubt, seen the man in the moon, but have you ever seen the wind itself in the clouds? In the picture above you do not have to look closely to detect him. There he is, even to puffed cheeks that seem to indicate that he is about to let loose a great blow to scatter the clouds or send a refreshing shower down to the thirsty trees and flowers below. The picture was taken by W. F. Hallowell while flying at an altitude of ten thousand feet.

Below are some giant ant hills found in many places in the central and northern sections of Australia.

Members of the Orchid Family are among the most prized of our wild flowers, unhappily become more and more so because of their increasing rarity. Too often are they torn from the soil to wither and be thrown away, and thus are gone forever from their natural habitat. The lady slippers are among the most common of the wild orchids as a group, although some species are quite rare. Above, at the left, is the lovely pink lady slipper with its delicate coloring, and next to it is Calopogan, a dainty bog-orchid of the Eastern States, now altogether too infrequently to be found. Photographs by L. W. Brownell. At the right is the smaller yellow lady slipper. Photograph by the late A. Brooker Klugh.

On the Barrier Reef

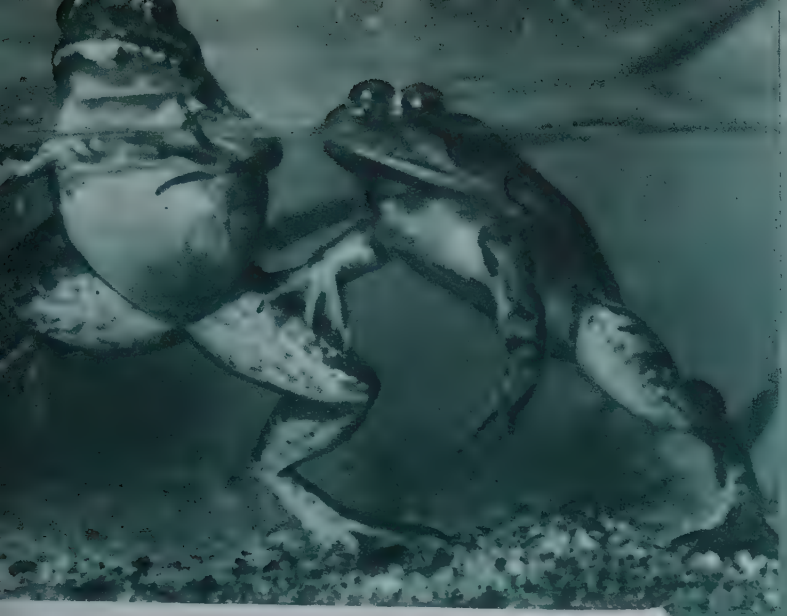
Never ending is the charm of tropical fish in all their varied colors, odd formation and interesting habits. Some we have been able to transplant to a life in the home aquarium. Others, somewhat too large for the average home, we must be content to watch in the larger aquarium, or, perhaps, to glimpse in their native waters.

At the top of the page at the left is the old wife, a graceful little fish that swims in schools and is common to the harbors of Australia. As they move through the water they look like a fleet of neat little schooners, their fins set like sails. They are banded with yellow and brown; their maximum length is usually about nine inches.

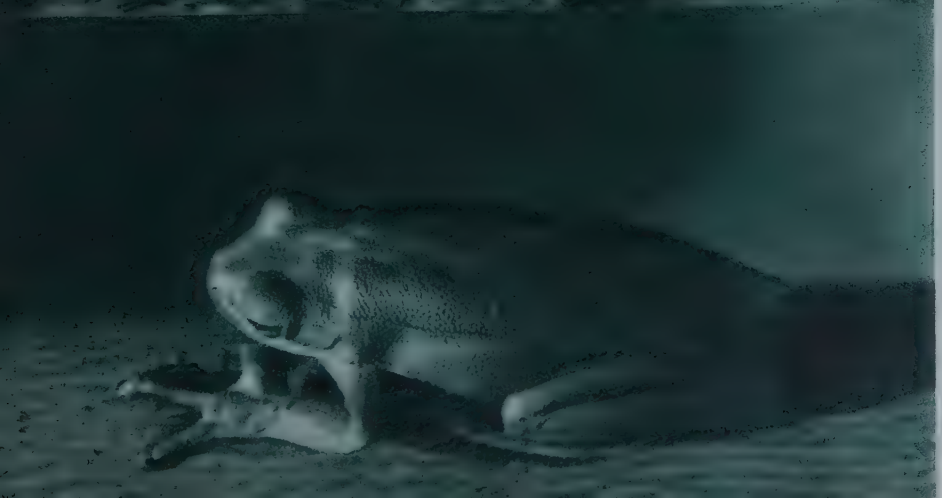
At the bottom of the page are some Moorish idols, beautifully-colored coral fishes common in the waters of northern Australia and along the Great Barrier Reef. They are distinguished by their long dorsal spine and a smooth skin. They feed on the minute creatures that people the coral reefs. They grow to be about seven inches long.

Above, a bit of the coral garden of the Great Barrier Reef has been reproduced in the Australian Museum. This Barrier is the greatest of all coral reefs, extending for 1200 miles along the coast of Queensland, Australia. In the lagoons there is a riot of color among the fish life. The butterfly fishes especially contribute to this with their generally yellow coloration, strikingly ornamented with bold patterns of black and other hues. They have plate-shaped bodies and snouts with bristle-like teeth.

WAITING FOR THE BOSS



The two green frogs above seem to be vying with one another for the privilege of being photographed, although, as a matter of fact, they probably are not the least concerned. These are among our most common frogs. The young of this species, however, have a particular claim to fame for their high-pitched voices. So strident is this call, in fact, that it has earned for them the name of "screaming frog" in parts of the country where they are particularly numerous and equally noisy.

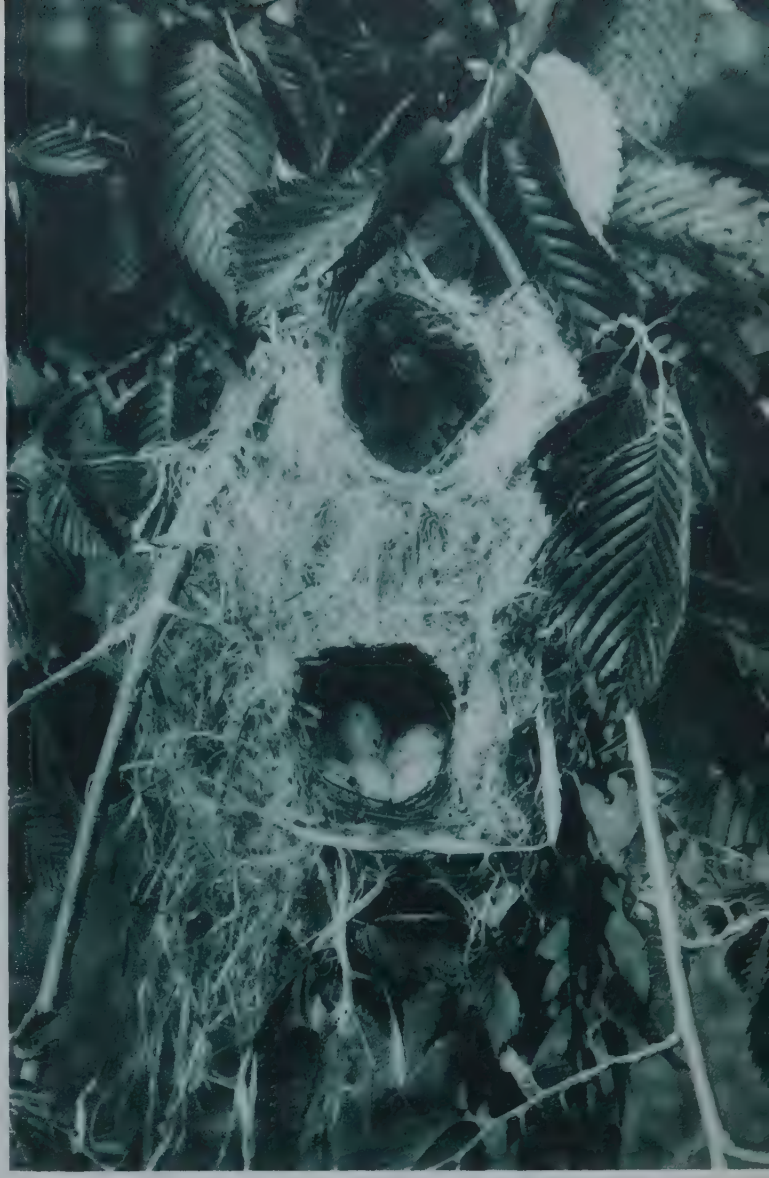


Above are two young pickerel frogs hardly past the tadpole stage. These frogs are about the same size and general coloring as the leopard frog, except that their spots are not surrounded by a lighter ring, as in the leopard. The underside of the pickerel frog is, also, more orange in color.

At the left is the hermit spadefoot, looking somewhat surprised about things and hanging on for dear life.

At the lower left is the green tree frog, a southern species that extends north to the tidal waters of the Potomac. It waits until mid-summer for its honeymoon, and then may be heard uttering its somewhat "tinny" notes in our marshes. In different parts of its range it is called tink-tank, or bell-frog.

Mr. 'Possum debates what to do about a little snake, wondering, perhaps, just how safe it is to investigate further. Not that the harmless little reptile will do him any harm, of course. Photograph by C. C. Alston. Below, Father Fur Seal says, "Good morning, ladies, are you all here?" Then he counts noses in his harem on the rocky beach of the Pribilof Islands in Bering Sea.

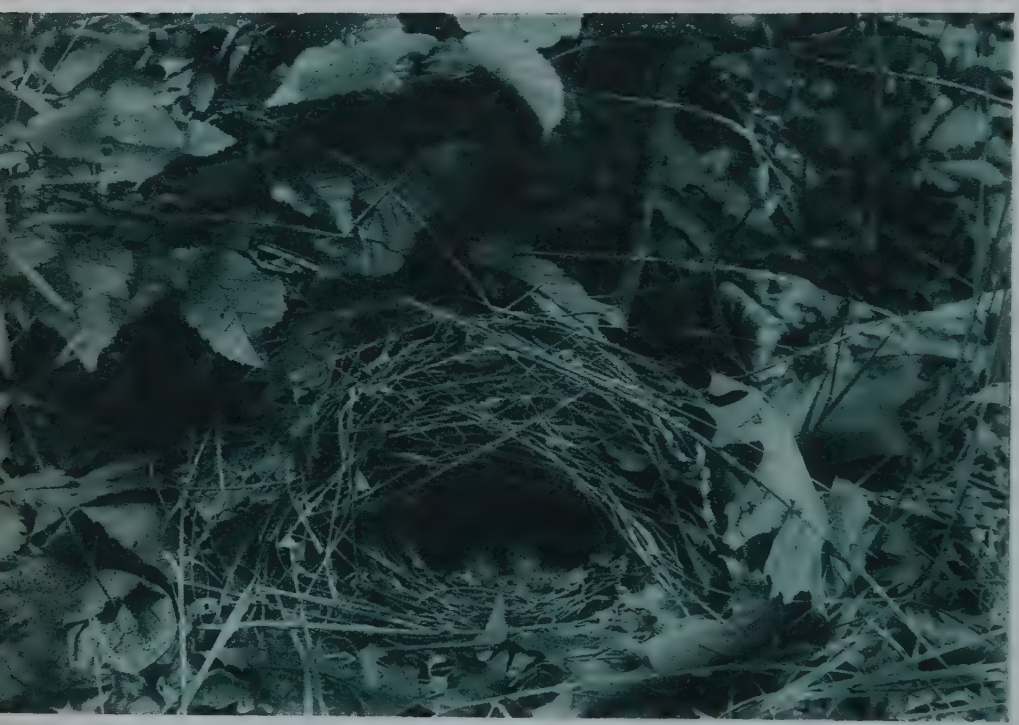


Homes of Our Birds

Their broods raised and launched into the world, our song birds are, for the most part, relieved of their parental cares, and have deserted their nests. Their homes, however, remain as an interesting study in avian architecture. They emphasize how varied bird tastes and habits are in the construction of nests. The photographs by Mr. Brownell in this group show the nests and the eggs as they looked a month or two ago.

Above is, of course, the dainty little nest of the ruby-throated hummingbird, with its tiny eggs nestling in some soft down or other material carefully worked into this little jewel of craftsmanship. At the right is the ever-fascinating pendant home of the Baltimore oriole with a little window cut out (to be closed later) to show the eggs that nestle deep and safe within. At the left, below, the eggs of the chimney swift seem in precarious position in the seemingly fragile shelf-like nest stuck to the inside of the chimney wall. It is, however, securely placed and the family will, undoubtedly, be reared without difficulty. At the lower right is what passes for a nest with common tern. It is hardly a nest at all, but the eggs blend in color with the surrounding sand, and are safer there than are the eggs of many birds.

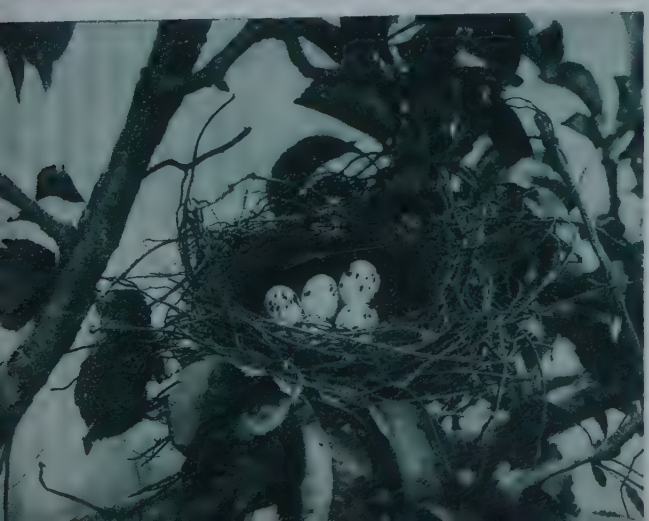
Nest and eggs of the mourning dove. This is a simple home, loosely woven and of rather coarse material. It must, however, hold the fairly large eggs and later the plump young, and has a considerable foundation for the purpose.

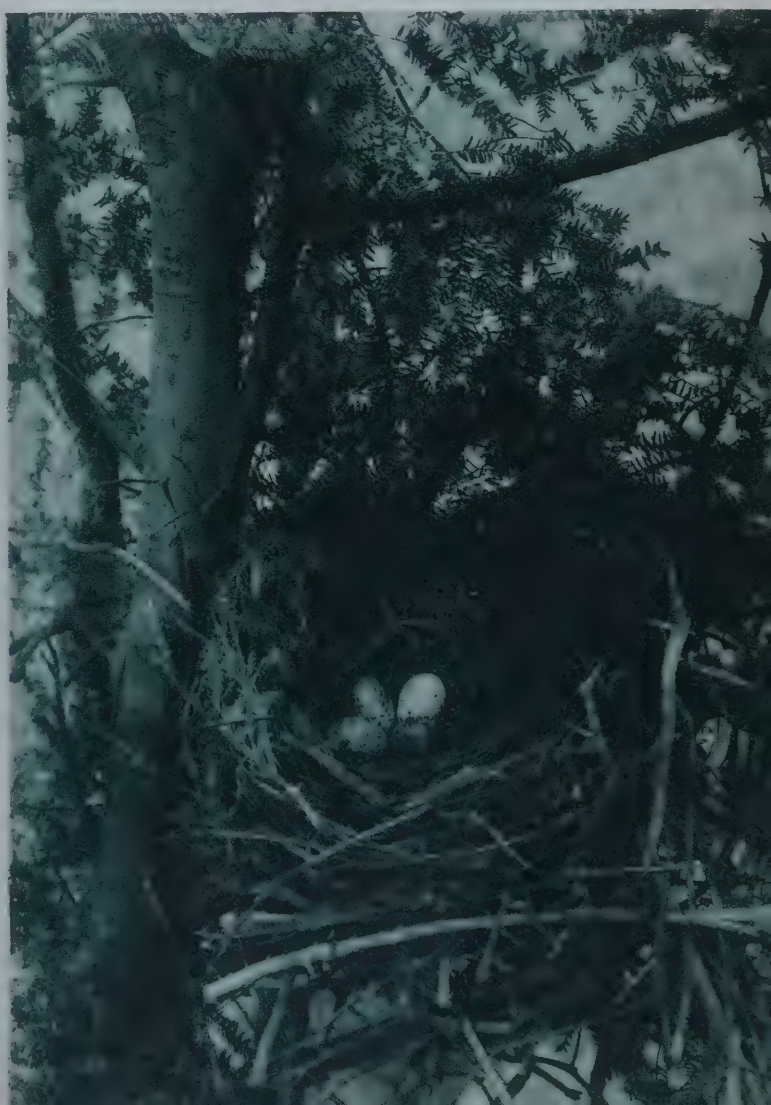


The cave-like nest and eggs of the oven bird is an interesting bit of architecture. Tucked away in a bunch of last year's leaves, and overhung with green, it is not easy to discover. The roof provides protection from the weather, and blends perfectly with the forest floor.

The orchard oriole builds a cup-like nest but does not go in for elaborate architecture as does the Baltimore. However, the nests are usually deeper than those of most other birds, a sort of compromise on the part of the builder.

Interesting contrast in five different nests. At the left, above, the bluebird has found a handy hole in a tree that needed only to be lined with nesting material. At the right we see the egg-filled nest of the ruffed grouse in a pine thicket. Immediately below, at the left, is the home of the bobolink among the tall grasses of the field, and, below that, the home of the kingbird, seemingly somewhat loosely placed on the branch of a tree. Below, at the right, the crow has gathered much material to provide a resting place for its four eggs.





Face to face with the tawny frogmouth, a nocturnal bird of Australia, distinguished for its soft-plumage, long wings, small feet, and very broad bill surrounded with bristles. It feeds on night-flying insects. There are four species in Australia, and, as a group, they range through southern Asia, the Malay Archipelago and Australia. When they rest during the day, their mottled plumage and curious stiff attitude make them resemble the broken limb of a tree more than a bird.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

SOLVING THE ★ BUREAUCRATIC JIG-SAW PUZZLE

IN THESE columns we have from time to time urged, as the only possible remedy for conflicting regulations and duplications, a centralization of federal bureaus having to do with conservation. We have seen the Bureau of Reclamation undoing the work of the Biological Survey. We have seen the Forest Service regulating grazing on National Forests in one way, while a newly created Division of Grazing in another department tries to regulate it in another. We have seen public works programs planning the erection of great power and irrigation dams in such a way as to cut off the migrations of salmon, and an agricultural administration limiting and even destroying crops as a remedy for supposed over-production, while, at the same time, Uncle Sam proceeds to irrigate new areas that will increase the total farm area.

Coordination of all these various government activities having to do with conservation is certainly to be desired, but, after reading Senate Bill No. 2665, it occurs to us that the old adage—"All is not gold that glitters"—is unquestionably a fundamental truth.

This Bill, to which House of Representatives Bill No. 7712 is the running mate, announces its purpose as a proposal to change the name of the Department of the Interior and to coordinate certain government functions. It suggests that the Department of the Interior be renamed the Department of Conservation and Works, and gives to the President of the United States authority to transfer various conservation bureaus to this new department.

To our utter dismay, it appears to us that the proponents of this Bill are seriously lacking in an understanding of the problems involved. To our mind, this Bill is a proposition to combine two separate, utterly distinct, and conflicting lines of work. Public works include the building of post offices, highways, bridges, railroad grade crossings, power plants, and all sorts of construction projects which have little or nothing to do with conservation. These are distinctly engineering projects that ought to be managed by competent trained engineers, and not used as a yardstick that will measure conservation values.

Real conservation has to do with natural resources. There are two kinds of natural resources. First, plants and animals, which are renewable in being dependent upon the soil, and which, to borrow a term from the chemists, may be called organic resources; and, second, non-renewable or inorganic resources, such as oil, natural gas, coal and metals. The management of inorganic resources is more or less an engineering problem, but the engineering type of mind is not the kind best suited to the administration of our renewable resources, such as plants, and animals (wild and domestic), which depend upon them. Organic or renewable resources bear the closest relationship to agriculture. While we are willing to admit that the present grouping of government bureaus is decidedly haphazard, a plan to reclassify them that neglects the fundamental differences between engineering and agriculture is a proposition likely to result in far greater confusion than ever. The passage of Senate Bill No. 2665 and its companion House Bill would, in our minds, be like jumping from the frying pan into the fire.

What, then, do we need for centralization of federal conservation activities? Having studied the problem actively for some time, we might venture to propose the following: There should be a definite distinction between conservation of renewable resources and public works. Public buildings and public works probably do belong in a reorganized Department of the Interior, and it is also logical to assume that such a department might administer the inorganic, non-renewable resources, such as coal, oil, gas and metals, for this, too, calls for engineering.

We now approach the great question of taking care of the renewable natural resources. Practically all phases of this problem are related to agriculture, and we believe that this close relationship to agriculture should be recognized and maintained. A Department of Conservation for renewable resources should, in our opinion, include the following:

1. The United States Forest Service, now in the Department of Agriculture.

2. The Bureau of the Biological Survey, now in the Department of Agriculture.

3. The National Park Service, which has always been a Bureau of the Department of the Interior. The National Park Service concerns itself with the conservation of both renewable and non-renewable resources, but it does not exploit its non-renewable resources, and, therefore, is more closely affiliated with the renewable resources group. This is particularly true because most of the National Parks are forested and all of them are most closely concerned with the preservation of wild animal and bird life.

4. The Bureau of Fisheries, which is at present under the jurisdiction of the Secretary of Commerce. The main functions of the Bureau of Fisheries have to do with maintaining the supply of fish for the future. Their activities in connection with such fishes as salmon, and protecting them against commercial interests run closely parallel to the duties of the Biological Survey as regards our birds and mammals.

5. The Division of Grazing, which was set up under the Taylor Grazing Act, frequently referred to in these columns. The Division of Grazing is now under the jurisdiction of the Secretary of the Interior. The Forest Service also administers grazing of domestic stock on the National Forests. The Biological Survey is concerned with the relationships between domestic stock and wild animals, in order that both may be maintained. The Forest Service, the Biological Survey, and the Division of Grazing all need to be coordinated under the same cabinet officer, and one who can keep his attention concentrated upon problems of the interdependence of living things.

6. The newly organized Soil Conservation Service. This was originally placed under the jurisdiction of the Secretary of the Interior, but was recently removed and placed under the administration of the Secretary of Agriculture by presidential decree. The work of the Soil Conservation Service is distinctly for the benefit of agriculture, including grazing. It has to do with the protecting of the soil cover for both domestic and wild animals and is, therefore, inextricably entwined with the problems of the Forest Service, the Division of Grazing, and the Biological Survey.

7. A part of the division of the Department of the Interior now known as the Land Office. The part we refer to now attempts to administer the interior forests of Alaska, although practically all other public forests of the United States are administered by the United States Forest Service in the Department of Agriculture.

8. That part of the Bureau of Education that attempts to manage the reindeer in Alaska. The idea of a Bureau of Education attempting to take care of tremendous herds of semi-wild reindeer is utterly without logical justification.

9. The so-called sub-marginal Farm Authority, one of the newly created government organizations, and one which, at the moment, seems to be under the jurisdiction of Dr. Tugwell. Re-location of sub-marginal farmers is closely affiliated with soil conservation, forests, and wildlife.

10. Such part of the Bureau of Reclamation, now under the Secretary of the Interior, as has to do with the planning and administration of artificially irrigated farm lands. The work of this Bureau at the present time is constantly conflicting with the work of the Biological Survey and with the whole attempt to plan agriculture on a national basis.

11. Various existing research agencies having to do with renewable resources, many of which are now in the Department of Agriculture, but a few of which are scattered among other government departments under other cabinet officers.

12. Certain now practically independent agencies, such as the Land Planning Section of the National Resources Board and the Planning Section of the A.A.A., all of which overlap the functions of the above bureaus.

13. Certain of the functions of the Geological Survey now in the Department of the Interior, in so far as the Geological Survey has to do with determining the values of watersheds, most of which are already administered by the Forest Service.

To properly carry out its work, such a Department for the Conservation of Renewable Resources might also need to include proper purchasing agencies and other business functions to permit the purchase or even the condemnation of land, where properly authorized.

Such a grouping of government conservation activities as we have suggested above seems to us the only logical combination. If any tinkering is to be done with our federal departments, if any swapping of authority is to be permitted, as between cabinet officers, it should be on the basis of a definitely constructive plan founded on real knowledge, and not upon blind experiment or upon personal ambitions of individual cabinet officers and their friends in Congress. We submit this program to our members and readers at this time because we believe that Senate Bill No. 2665 and its companion House of Representatives measure do not deserve the support of any true conservationists, and we urge upon all our members and readers that they make their desires in this respect known to their Representatives and Senators in Washington, demanding that there shall be no more wild juggling of bureaus, but a thorough-going centralization based upon sound differentiation between renewable resources and engineering problems. There can be no question of the need for logical and coordinated administration of our natural resources on a broad basis that will take into consideration all problems of interdependence.

SALMON LEAPING A FALLS ON ITS MIGRATORY TRIP TO SPAWNING GROUNDS

Thus it fights its way a thousand miles up the Columbia River, but it cannot leap great dams and runs the risk of extermination by such construction activities in the River

Salmon or Kilowatts

Columbia River Dams Threaten Great Natural Resource

By WILLIAM L. FINLEY

Field Naturalist of Nature Magazine

BUILDING dams for purposes of power or irrigation, whether actually needed or not, has become a national mania. From the point of view of conservation it has also frequently become a national menace. Spurred by plans to provide employment through public works, many such programs have been undertaken without adequate thought being given to their general value and effect. Some of these projects destroy existent wealth or endanger some other resource. The construction of dams in the Columbia River in Oregon is a typical instance.

Of all the rivers in the world, the Columbia is the greatest salmon stream. It has produced, and still produces, more and better salmon than any other stream. In February or early March the great spring Chinook salmon leaves the ocean and starts its dramatic run. Slowly it fights its way up the river, a thousand miles or more, to the spawning beds at the headwaters. There, in September, the eggs are laid and from these headwaters the fingerlings must make their way back to the sea. Nature has endowed this fish with this migratory urge. The salmon has found the Columbia River to be a stream where conditions are favorable for it to answer the call. If these conditions are destroyed the salmon run is destroyed. No power of man or Nature can restore it.

On the economic side, the annual income from the salmon fisheries of the Columbia is between ten and twelve million dollars. This is five per cent on a two hundred million dollar investment. It is certainly not extravagant to expect that careful thought should be given to any project calculated to destroy such a resource.

Protection of this resource has been a constant battle. Over-exploitation has been continuously fought. Unscreened irrigation ditches in the upper reaches of the river have led the fingerlings out into the fields to die when the water dries up. Pollution is a menace that must constantly be fought. Finally, the greatest danger of all —dams for electrical energy and irrigation—threatens the future of the Columbia River salmon run.

Perhaps the greatest lesson to be drawn from what is happening on the Columbia is the need for a careful and complete survey before any such development project is undertaken. Rivers serve a variety of purposes. They furnish water for domestic use and irrigation; produce power; provide navigation; serve recreational purposes; and sustain fish for food supply. Before steps are taken to conserve any stream for any one of these purposes it should be definitely established which is the most important service of the river.

Had this been done in the case of the Columbia River certain vital facts would have been brought out. It would have been established that no experience in the past shows how to reconcile high dams with the migratory habits of such an important fish as the salmon. It would have shown that there is no knowledge of what would be likely to happen to the schools of fingerlings when, returning to the ocean, they encountered the heavy flow of water through large turbines. It would have demonstrated that to change the Columbia River into a series

GRAVITY FISHWAY OR FISH LADDER

This is the best method of leading salmon over dams. This picture is taken at low water after the spring run

of great lakes would result in the destruction of the spawning places of the salmon; change the food supply now available to the migrating fingerlings; and bring such fish as bass who naturally feed on fingerlings.

No such study was made. Paying no attention to the food importance of the Columbia River, the Federal Government has appropriated $31,000,000 to build a sixty foot dam across the river at Bonneville. It also appropriated $60,000,000 for a two-hundred foot dam at Grand Coulee. These projects are under way. At Grand Coulee no consideration whatsoever has been given to the salmon run. Bonneville Dam, however, is only slightly more than one hundred miles from the mouth of the river. It is, therefore, of vital importance with respect to the salmon.

The United States Bureau of Fisheries has been advocating the installation of elevators to transport the salmon over the dam. These are costly and have no proved background. It is not known whether the fish will even enter these complicated devices. Two such elevators, however, will be installed. Fortunately, however, the Bureau of Fisheries has come to realize the uncertainty involved in these elevators and is supporting the installation of five fishways. This is the only natural way of helping the salmon solve the problem created for them by man. These gravity fishways are series of pools, one above the other, leading around the dam. The fish are able to ascend in small leaps to upper waters. There is ample water to supply these fishways.

Lack of appreciation of the importance of the salmon prevails with those holding the purse-strings. Fish experts and engineers estimate that $5,000,000 will be necessary adequately to safeguard the salmon run. Secretary of the Interior Ickes allotted $2,500,000. This necessitated cutting down the dimensions of the fishways, and the first has been started on this restricted basis. The money allotted has since been increased to $3,200,000, which, according to experts, is still sadly insufficient.

Thus the Federal Government is experimenting and gambling with a natural resource of high value. It is endangering an important food supply. While spending billions in many debatable ways, it is saving a million or so by tampering with the future of a two hundred million dollar industry. And, sadly enough, there is grave question whether conceivable future needs for electrical energy will ever justify pouring millions into the building of the dams at Grand Coulee and Bonneville.

•

While the future of the white pelicans of Great Salt Lake seems at the moment to be less dark than it was, eternal vigilance is required lest selfish or misguided interests institute quiet attacks upon these birds. Jay N. Darling, Chief of the Biological Survey, has taken an active interest in the protection of these birds, and the Fish and Game Commissioner of Utah has at last been enlisted in their behalf. Through the activity of the Emergency Conservation Committee and other conservationists attention has been called to this issue, the details of which are described in a pamphlet issued by the Committee. The white pelican has been the object of persecution on the ground that it eats game and commercial fish, a charge that is entirely false since it lives almost entirely on so-called trash fish.

The California Roadside Council, 3311 Pacific Avenue, San Francisco, has brought out an effective pamphlet entitled *Your Roads and Highways*. It graphically summarizes all salient points relative to highway development and control and emphasizes effectively the vital importance of proper supervision and restriction on this development.

•

Through a bond issue authorized in 1927, California has built up a chain of State Parks and Historical Monuments representing an actual investment of about fourteen million dollars. This does not include many areas given outright to the State. A complete summary of the acquisitions has been compiled by the State Park Commission.

Carving the Mountains!

By STEPHEN HAWEIS

IN THOSE days when the chief use of a pocket knife was to deface something—the edge of a chair, table or window-sill—I did not welcome interference, and was unable to understand that anything was permanently injured by a few cuts that had given me infinite pleasure to make. I sank at times to the level of carving my name or initials upon school desks and am glad—now—to remember that I was obliged to pay in pain for the privilege. There is a German proverb that says that "The names of fools are seen everywhere." It stuck in my mind and I think of it whenever I see the bark of trees defaced with names, yea, even those for which there is some excuse, such as the names of those who loved one another and forgot that the tree had no sort of interest in either of them. It is an evil thought also to think of the slow enlargement of a deeply cut name as the tree grows in girth. It is pleasant, on the other hand, to remember that living tissues does its best to obliterate the names of the foolish even when it does not succeed.

Should not a sense of decency be cultivated in regard to things in Nature which, even when they are privately owned, are inalienable public property in the sense that everybody may look at them? We ought to appreciate that nobody has any right to foist himself upon the attention of total strangers without reason, and permanence ought not to be demanded for a few minutes of any kind of diversion. Rocks and trees should be left inviolate unless what is done to them makes them more agreeable for everyone to see. Happily most of the places where names are carved are of little importance. Happily Nature has a way of filling up the scars with lichens and mosses, correcting the bad manners of the thoughtless in the gentlest possible way. But what shall be said for those who are not thoughtless; who still sully the beauty of Nature's handiwork with their indiscretions? When the name of Smith is carven in immortal granite, in proportions large enough to be seen for miles! Even did he put up the most delicious of pickles, or manufacture the most exquisite of safety razors, it is doubtful whether the fact will be of much interest to anybody in five hundred years. Should he be allowed to deface a mountain which, I reassert, belongs to posterity just as much as it belonged to our forefathers? I think not, and though I be "small and of no reputation" I wish that a megaphone could be found to amplify my voice to protest and persuade those who have power to prevent the Jungfrau peak from becoming an image glorifying the Twentieth Century Girl, or the Andes from being carved to represent Smith's notion of the Twelve Apostles.

Those whose works are unimportant enough to require the assistance of immensity should follow the example of the Pharoahs and build pyramids which they might then carve to their hearts' content—having purchased the land upon which to construct them. May I be not there to see, but that is at least a conceivable right. It may be for that large deserts were created, for pyramids—and perhaps cornet-players. But I affirm that there is no sculptor, living or dead, who is, or was, great enough to be allowed to perform his wonders upon the face of a noble mountain, vast rock or cliff, which has been known and loved for a thousand generations by the sons of men. Phidias, Praxiteles, Michelangelo, Rodin, or Smith himself, should not be able to acquire such terrain for such a purpose. It is no person's right, no Government's right, to give or deliver a great natural monument over to a mortal so that he may make it smaller with his alleged art.

"WHEN A MOUNTAIN SPEAKS IT DOES NOT NEED A MAN'S VOICE TO ASSIST ITS MEANING"

Let us remember what one of the Black Crows said of another form of art: "Even if that was good I wouldn't like it!"

The infinitesimal differences that exist between competent sculptors make no difference. Let them make what they can and what they choose, but let us reserve the right to refuse to see their product. When a god or a

general is represented in immense proportions in a public place, one is compelled to see, and we may be sure that, good, bad or indifferent, it will give great offence to a great many people—those who do not believe in the god, or those whose homes were burned by the general. Religion itself, expressed in the form any one generation can give to it, should not be symbolized by an inescapable graven image, especially when the ungraven background does it much better and without offence to this or any other generation. Patriotic sentiment belongs to its own age and I for one am glad that there is no portrait of one Henry the Fifth, forty feet high, because he put over a hot success at Agincourt in 1415.

It is my guess—would that I might live long enough to profit by a bet—that a hundred years from now the largest representation of any human creature, be it executed by the greatest of living sculptors or not, will be of slight interest to anybody, and nobody believes that gigantic sculpture offers so fine a medium for art as works of moderate size. I am one of the thousands who do not believe that any great artist would accept a commission to carve a mountain. I believe a great artist knows that when a mountain speaks it does not need a man's voice to assist its meaning, but I am willing to accord a laurel wreath, a gold medal, a title of glory to Smith; I will grovel in his presence and praise his name like anything, if only he will confine his art to his studio and keep his hands off the job of polishing, after his own fashion, the poems which Nature began in hers. Posterity will think the better of Smith also, but if compelled to gaze upon his labors in colossal proportions, I pray that a certain German proverb will suggest itself.

•

Do Natural Enemies Destroy More Game Than Hunters?

SUCH is the claim made by many of those who try to place the blame for steady reduction in game stocks on any agent rather than on the hunter. There occurs to us at once, however, a number of reasons why we should be wary of accepting this claim at face value.

A general argument of much force is that game stocks and their natural enemies evolved together, evidently achieved mutual adjustment of numbers, and maintained their average populations until man's influence became pronounced. He interfered not only by selective killing but also by working tremendous and often unfavorable changes in the environment. Without man in the equation, game and predators both thrived; with him as a factor, both natural enemies and game species suffered, but the latter most obviously so. It is difficult to draw any conclusion from the long-time record other than that man is both directly and indirectly responsible for the dwindling of stocks of game animals.

Another point usually evaded by those defending the record of hunters as against that of natural enemies, is that the predators take their toll largely from the ranks of the immature, while hunters destroy chiefly the adults. Heavy losses of young is a general rule in Nature; in fact, in each generation all perish except enough on the average to replace the parent stock. In all game animals this means that the natural process is survival of only two adults in each generation. If hunters killed the young and those alone, the effect might not be noticed; but when they kill adults, they are eliminating the already highly selected and precious breeding reserve upon which continuance of the race depends. Grouse or ducks can better lose several young than one adult, and the proportion increases in some groups, as in most fishes, where perishing of hundreds, even thousands, of the immature has less effect on the population than the elimination of a single adult.

These partly theoretical considerations may not appeal to some minds as much as more concrete, presently observed, cases of the inter-relations of hunters, natural enemies, and game species.

If natural enemies were the factor causing shortage of game, why is it that game is observed to increase in areas where hunting is excluded but all other unfavorable conditions remain? Illustrations of this occurrence may be seen in suburban and parked areas of many cities, where natural enemies of quail, as rats, squirrels, dogs, and cats, are abnormally abundant, yet the quail maintain themselves in greater numbers than on equal areas of farmland. The reason seems very clear; there is no hunting.

The same result was exemplified on a large scale by the increase of quail in Ohio under state-wide protection of the birds from hunting. They were not shot, except to a slight extent illegally, and in 18 years are known to have increased fivefold. Natural enemies no doubt carried on as usual but as hunting was stopped the quail population constantly tended toward the normal maximum.

If hunters will only admit these facts and plead for reduction in natural enemies under certain conditions so that more of the young of game species which they chiefly destroy may grow up for hunters to kill, they will be well advised. It does their cause no good to charge that natural enemies are responsible for reduction in game stocks when the fact that hunters themselves are responsible is apparent to any thinking person.

ADMIRALTY'S BEARS

By ARTHUR NEWTON PACK

ONE OF THE BIG BEARS OF ADMIRALTY ISLAND, ALASKA, PHOTOGRAPHED BY ARTHUR NEWTON PACK

At Burlingame, California, we dropped in by airplane to call upon the well-known writer, Stewart Edward White, in his beautiful home. In his library, with walls hung with pictures of his excursions among the wildlife of North America and Africa, we sat discussing bears. Not just bears generally, but bears specifically—the great bears of Admiralty Island off the coast of Alaska.

Besides sharing an active interest in wildlife and its conservation, Mr. White and I have this special interest in common. Mr. and Mrs. White cruise every summer in the coastal waters of British Columbia and Alaska. Mrs. Pack and I have twice done the same. None of us have ever shot an Admiralty Island bear with anything more deadly than a camera, but we all have done that on several occasions, from distances of only a few feet. And we enthusiastically share the conviction that the bears on this large island should be given more protection, for here they occur in greater variety, and by their relatively greater accessibility afford the wildlife student and photographer his best opportunity to see one of the most remarkable of our North American mammals.

Admiralty Island, mountainous and heavily timbered, is part of a National Forest administered by the United States Forest Service. The big brown bears hibernate in the mountain country, coming down in summer to fish in the salmon streams. In early spring and again in the fall they are sought by big-game hunters licensed to kill them, but are also subject to constant attack by salmon fishers, natives and others cruising in those waters, who claim to shoot in "self-defense". The greatest menace to their future, however, lies in whether the timber is eventually to be cut for pulp and what is to happen to the bears in the process.

For some years certain of the better class of magazines devoted to the outdoors have voiced the conviction of conservationists that the great bears of Alaska, which are the largest bears in the world, were deserving of better treatment than they have received. Mr. White has been in the front rank of their defenders, and the American Nature Association has contributed its mite. There have been a few encouraging signs of improvement. Traffic in skins has long been illegal, and seasonal bag limits have been reduced to two. Certain areas have been declared sanctuaries, but the subtle encroachments of our modern civilization have been steadily at work even in the far places of the earth. In the case of the great bears of Admiralty a supposedly potential demand for raw material for newsprint has been paramount.

In response to public pressure, epitomized by Mr. White's pleas in *The Saturday Evening Post*, the Department of Agriculture has issued "A Plan for the Management of Brown Bear in Relation to Other Resources on Admiralty Island, Alaska" by B. F. Heintzleman of the Forest Service, and H. W. Terhune of the Biological Survey, who is also executive officer of the Alaska Game Commission.

This report, which is well organized, describes in some detail the physiographic conditions and the resources—principally the forests, fisheries and recreational facilities. Naturally, the forest is given most consideration. Briefly, it contemplates the establishment of timber-cutting and paper manufacture involving an investment of seventeen million dollars, and an estimated yearly production of paper said to be worth five million dollars. This, of course, is in the future and dependent upon the very uncertain demand for additional pulpwood resources.

It is proposed to establish two bear sanctuaries—where no cutting will be done. One, Pack Creek closed area, covering twenty-one square miles, includes the watershed of Pack Creek, which empties into the west side of Seymour Canal; the second, Thayer Mountain closed area, sixty square miles in extent, lies on the western side of Hasselborg Lake, in the center of the island.

The establishment of these areas indicates a step in the direction of preservation, but we do not believe that they are large enough to provide adequate protection.

Stewart Edward White also believes that only absolute sanctuaries, covering large areas, will adequately meet the needs of the growing class of people who are interested in observing and photographing these superb animals in preference to killing them. He points out that where bears are hunted they soon become wise to their danger and are very difficult to approach, and that hunting results in a crippling of some that escape and recover, but thereafter remain savage enemies of the whole human race. Too much inter-mixture of hunting and sanctuary areas, such as is proposed by the Heintzleman and Terhune official plan, is, therefore, an unsatisfactory compromise. A further difficulty is the extreme uncertainty that accompanies any long-time plan that must be carried out by suc-

cessive officials who are certain to have differing attitudes toward wildlife.

Alaskans of the promoter type, and some government officials, like to talk in terms of "Economic Development". They envision employment in lumbering and paper manufacture and the industrialization of Alaska for the benefit of Alaskans, all a very fine-sounding theory. Someone, however, has given the definition of the word "tragedy" as "a theory confronted by facts". The facts are that in neighboring British Columbia, nearer the great markets of North America by half a thousand miles, just such pulpwood developments have been tried again and again and failed, leaving the worse miseries of stranded, unemployed men and women. Meanwhile, science has taught us how to utilize fast-growing southern pine for news-print making, and spruce is being progressively replaced by other woods for paper making. What, then, of Alaska's pulpwood exploitation dream?

Should Alaska run the risk of destroying the unreplaceable asset of its wildlife and trading this birthright for a mess of pottage? Mr. White, who knows and loves Alaska, says, "No!" The money that is being brought into Alaska and will, with adequate bear protection, continue to be brought in by interested visitors, is a definite and assured economic asset, as opposed to the possible loss of a small part of the all very uncertain industrial revenue to be derived from pulpwood exploitation. He is strongly of the opinion that, in the broader sense of conserving the public interest, Alaska will do better by preserving the forests on this island as a public recreation area and wildlife refuge than by cutting it. He is, therefore, committed to an effort to have set aside on Admiralty Island, as a permanent sanctuary for the big bears and other wildlife, a much larger area than is comprised in these two relatively tiny sanctuaries.

We agreed thoroughly on that. Unfortunately, the United States Forest Service and the United States Biological Survey have not, as yet, taken the same position. Possibly the heads of these respective government services will meet on the ground this summer, in company with Mr. White. We hope that what he is able to show them will be strengthened by the force of public opinion, which will demand recognition of wildlife as a national asset worthy of thorough-going protection.

•

Hornaday on Ducks

WHAT PRICE DEAD DUCKS? is the latest brochure by Dr. William T. Hornaday, director of Conservation activities of the Permanent Wild Life Protection Fund, issued in June by that organization as Bulletin No. 12. Its text is indicated by the subtitle "Shall there be Some Waterfowl left, or None?"

Those who understand Dr. Hornaday's viewpoint will know beforehand that he wants some waterfowl left, and that to this end he urges an immediate closed season. But he does more than merely urge this course. Into this 47-page pamphlet he has crowded more facts bearing on the present desperate condition of our birds than we believe were ever before set forth in an equal space.

The rapid and progressive wastage of our unsurpassed wealth of waterfowl is briefly but convincingly reviewed, and the blame is distributed where it belongs. Various bugaboos that have played rôles in the befuddlement of the public are set forth in their true light, and exploded. The folly of depending on the "Duck Stamp" to restore the birds is rather fully considered. "As a mass they (the duck stamp hunters) are now a unit of menace, to be dealt with in settling the now acute issue, "Shall there be *some* American waterfowl, or *none*". And in refutation of the scare-crow that the opponents of the proposal to close the season have set up, he presents a full-page table that shows the loss of revenue that will be suffered by the various State Game Departments if the waterfowl shooting is outlawed. The distribution by States of the 545,-815 duck stamp hunters in 1934 is figured (there are about 611,000, but State apportionment for the others is unknown). We cannot here analyze all the results that are shown, but the figures show that the total revenue received by 47 states and Alaska in 1933 (1934 figures not known) totaled $8,747,242. Of this duck hunters contributed only $874,954. On the assumption that the number hunting ducks in 1935 would be about the same as in 1934, and deducting this amount, $7,925,566 would be available to the states for enforcing their game laws. From a perusal of these facts the inevitable conclusion is that, if the states wished to enforce a closed season on our waterfowl, they could do it.

We agree with Dr. Hornaday that there has been and there still is, a deplorable lack of leadership in wildlife preservation, and we advise all persons interested in saving our great resource in waterfowl to read, if possible, *What Price Dead Ducks?* It should help them to place the blame for present conditions where it belongs.

Mr. Darling and Leadership

In mid-April Jay N. Darling, Chief of the United States Bureau of Biological Survey, boiled over. Tuning up for a swan song—according to his own threat—he lashed out at the Administration and "conservationists." He charged the former with impeding wildlife conservation by refusing funds and real support. He charged the latter with bandying words and doing nothing.

Somewhat mystified by the attack on those sincerely interested in the future of our wildlife resources, we wrote to Mr. Darling, saying:

"You are quoted today in the newspapers as declaring that conservationists applaud you but do nothing. Assuming, for the sake of argument, that this is a fair statement, what do you want them to do?

"Men and women interested in the preservation of our wildlife resources need a leader in a place of power. When you assumed the difficult task of Chief of the Bureau of Biological Survey, true conservationists felt assured of that leadership. We were confident that it would be a militant leadership; that it would not reflect the tongue in cheek attitude of so-called conservation groups of sportsmen who want to have their game and kill it, too.

"Those truly interested in wildlife conservation do not know where you stand. They have been unable to reconcile a destructive duck hunting season, such as the last one; the continuation of baiting and the use of live decoys; the wildlife poison program of the Bureau and other policies with true conservation. Furthermore, you have not called on us for specific support. You have not told us what you wanted us to do, and you now complain that we do nothing.

"Although the nearly six million hunting licenses reveal an army of killers all out of proportion to our diminishing wildlife resources, there is a great body of non-killers that will follow leadership.

"The hunting element has been administering a conservation hypodermic too long, Mr. Darling. We need more stimulant and less dope. Tell us what you want and how we can help you get it."

Mr. Darling's reply, which we print in full with his permission, was as follows:

"Your one hundred percent expression of dissatisfaction leaves me so completely submerged that I shall not even try to dig out.

"We are just finishing up the first year of my voluntary contribution toward the administration of the Biological Survey. During that year we have

1. Added 661,000 acres to the migratory waterfowl restoration program.
2. Withdrawn approximately 10,000,000 acres of public domain for State game reservoirs.
3. Apprehended and convicted 700 violators.
4. Reduced the repeating arms and automatics to a three-shell limit.
5. Reorganized the Bureau of Biological Survey.

"The work of this year has been accomplished on a financial footing which provided a 28 percent cut in the Bureau budget. The work which was accomplished, and which you choose to call nothing, was made possible, not because of any appropriations allocated to this Bureau, but by finangling Bureau projects out of other Government agencies to which money was originally appropriated.

"Having made what seemed to us a little progress during the first year we hoped that we might have a recognition of the needs of wildlife expressed in some of the legislative programs which were being crowded through the House and the Senate. In spite of profuse promises from administration sources and from legislative personnel, wildlife was ignored in the definition which provided the expenditure of $4,800,000,000 of emergency work funds.

"Legislation which is needed for the proper carrying out of the duties of the Biological Survey is side-tracked in both Houses. Changes in the personnel and their rating in the Bureau which were made last August, at the time of the reorganization of the Bureau, have not yet been authorized by the Civil Service Commission. So far as I can discover there has been no effort on the part of any of the conservationists of the country to contribute any real assistance.

"Your gratuitous assumption that I came into the picture to assume leadership is entirely without foundation. I am not even a candidate and never have been. I came down here volunteering to be of what service my humble capacities might afford. It will be a great day for conservation when there are more workers and less lip service."

JAY N. DARLING, CHIEF OF THE BUREAU OF BIOLOGICAL SURVEY, AS PICTURED BY SUDDUTH IN THE WASHINGTON STAR. WE TRUST THAT IT IS NOT THE LAST DUCK MR. DARLING IS DRAWING.

Apparently we owe Mr. Darling an apology for having "gratuitously" or even logically credited him with a willingness to lead the cause of wildlife conservation. In our own defense, we must explain why we felt our assumption justified. The Biological Survey, which Mr. Darling heads, is the branch of the Federal Government most vitally concerned with the present and future of our wildlife. We, the people, have set it up to keep us advised of the wildlife situation. We have felt that we must look to it to assure that these resources may be passed on, undiminished, to the next generation. Logic seems to indicate that the man at the head of that Bureau should voice that need, and, thus, lead public thought and action in the proper direction. Mr. Darling, it appears, does not share this view. We are sorry.

In his letter, Mr. Darling cites accomplishments. The acreage in the United States added to the migratory waterfowl restoration program is excellent. But the fact still remains that eighty-five per cent of the migratory waterfowl shot in the United States breed in Canada.

Addition of ten, or one hundred, times the number of waterfowl refuges on our side of the border will not change the habits of the ducks and geese or increase the domestic-bred fowls fast enough to restore the overshot ranks of these birds. Nor will the reduction in repeating arms and automatics to a three-shell limit save many ducks. One more immediate and drastic step is essential—a closed season on migratory waterfowl in 1935.

The withdrawal of some ten million acres of public domain for State game reservoirs, while excellent in theory, proves debatable as to its effect in many cases. That much of it is worthless for the production of living things is proved by the fact that it is still public land. It has been tried and found wanting.

The reorganization of the Bureau appeals to us as something like making the beds and dusting the furniture while the house is burning down. Much better to turn a hose on the fire.

In justice to Mr. Darling we must admit that he put his head on the block when he took this job. He left a comfortable life, concerned with wielding perhaps the most able and powerful drawing pen in the United States, for a complicated and controversial task. A genial and gregarious gentleman himself, Mr. Darling found that militant championship of wildlife preservation meant offending the powerful and persuasive Messrs. Foran, Knapp, Beck, Hawes and others. They knew the right people in the right places. They could make things difficult. It was easier to be their friend than their foe. By such a course one might win concessions from them for our wildlife. The theory has not worked, and never will.

So Mr. Darling has lost an opportunity. He has tossed into the discard the chance of striking a real blow for wildlife conservation at a time when such a blow is so sorely needed. He has been satisfied with building for the future while the foundation is being eaten away by the termites of present destruction. Had Mr. Darling carried the credo of his cartoons and his spoken words into practice, he could have been a real champion and perhaps a successful one. If he failed, after an heroic effort to effect sorely needed reforms, he would still retain a powerful strategic position. He underrates his capacities—they are far from humble. But we now know why. He did not wish to lead. This is distinctly unfortunate.

•

"To Keep Seed Alive upon the Face of the Earth"

MAN claims dominion over all living things and traces the claim back to Genesis. There we find, it is true, that God is recorded as saying to Adam and Eve, "Be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth" (Gen. 1: 28).

The subduing part of this injunction seems to have taken root most deeply in mankind, and animals have been transformed by domestication, moved from land to land, crowded from their native homes, over-exploited for food, seriously reduced in numbers either as pests or as objects of sport, and in many cases, through one or a combination of these processes, actually exterminated.

Man, in the mass, evidently is prone to destroy, and the dominion idea has been cited as a defense against even such feebly protective measures as game laws. Some contend that as God has given to man dominion over the beasts, the sovereign (or state) has no authority to deprive subjects (or citizens) of a right which God has given them. In their opinion, apparently, there is a right to destroy but no authority to conserve.

If scriptural admonitions are to be taken as the basis of policies toward wild life, it can well be asked why Genesis readers have not persevered beyond the first chapter. Are they only short story readers? Or do they see only what they wish to see?

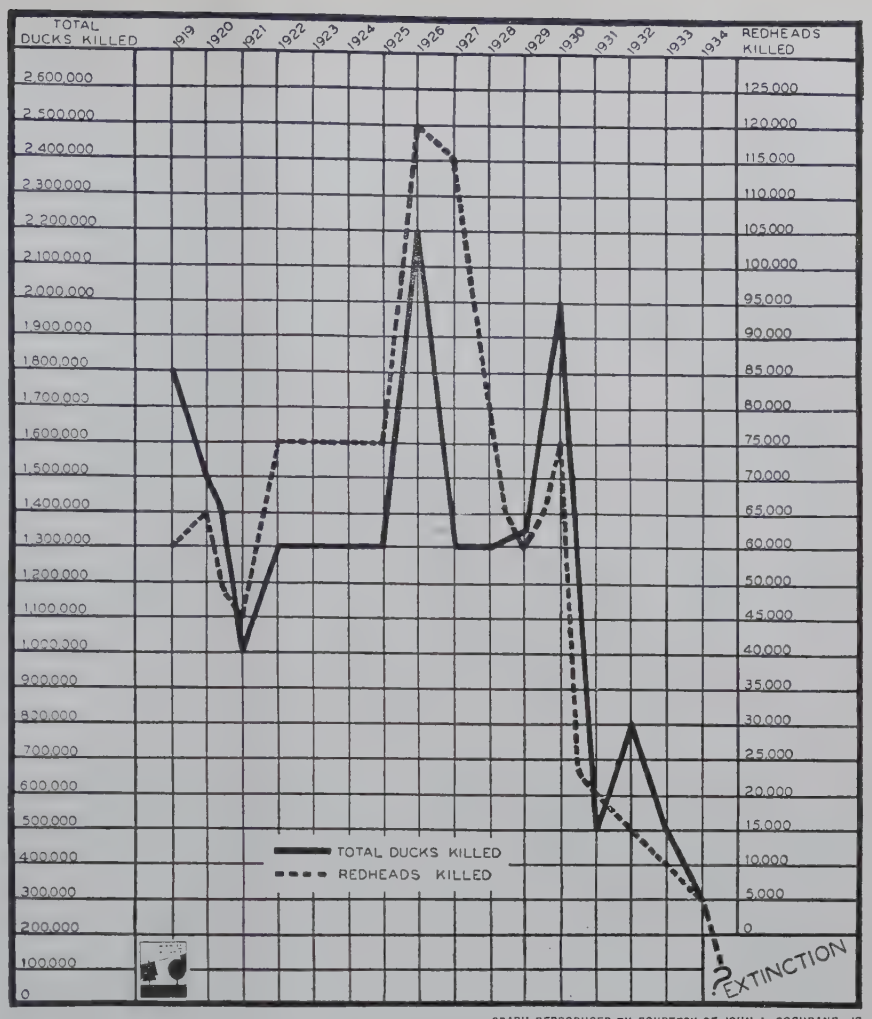
If having dominion over living things was enjoined through Adam, then preservation was admonished through Noah. One need read only to the sixth and seventh chapters of Genesis to find all the authority needed for preserving wild life. There we read among Noah's instructions when loading the ark:

"Of every clean beast thou shalt take to thee by sevens, the male and his female; and of beasts that are not clean by two, the male and his female. Of fowls of the air by sevens, the male and the female; to keep seed alive upon the face of the earth" (Gen. 7: 2, 3).

"To keep seed alive upon the face of the earth" was an injunction of value not only in the long, long ago, but now, today, every day. Those who try to heed Biblical admonitions can not consistently give greater adherence to subduing than to keeping alive. Subduing, having dominion over, does not mean extermination, but keeping seed alive upon the face of the earth does mean preservation.

It would seem that obedience to these dicta heretofore has almost been by contraries. Is it not full time to give the sixth and seventh chapters as much weight as the first, and to keep seed alive upon the face of the earth? Every failure in this respect—and the list of such failures is a long and sorry one—should be cause for intense regret on the part of all thinking men, and of renewed determination not to let it happen again.

Shall We Save Our Waterfowl?

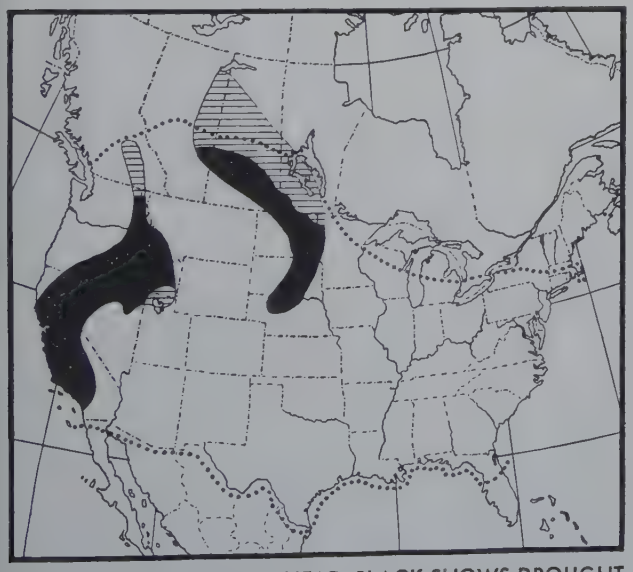


GRAPH REPRODUCED BY COURTESY OF JOHN J. COCHRANE, JR.

THE CRISIS confronting American waterfowl is well illustrated by this graph depicting recent duck decline in Minnesota, the only state that has faithfully compiled kill totals from hunters' annual reports ever since 1919. The solid line represents total duck kills on the figure scale to the left, while the superimposed dotted line records the disheartening fate of one species, the redhead, with the numerical legend to the right.

Note the agreement in the two lines. The number of ducks killed reached its peak in 1926, when 2,500,000 were taken, while dead redheads reached an all-time high of 105,000 that same year. In 1930, when devastating drought first blighted the great prairie breeding areas, the totals were 2,000,000 and 75,000 respectively. From then the graphic tale is one of disheartening depletion, reaching ominously near the threshold of extirpation in 1934, when 300,000 ducks and 5,000 redheads were reported taken.

The graph, compiled by the Midwest Conservation Alliance of St. Paul, an organization correlating the sentiment of midwest sportsmen for a closed season, was first printed in that organization's "closed season appeal to the President." Clifford R. Sakry of St. Cloud. Alliance secretarial director, made the graph, from statistics compiled from official Minnesota Conservation Department records by Cyril W. Plattes, executive-director of the Alliance, St. Paul, Minnesota.



BREEDING RANGE OF REDHEAD. BLACK SHOWS DROUGHT AREA; DOTTED LINES, LIMITS OF SPORT SHOOTING

The significance of the kill of redheads in Minnesota is clarified by reference to the accompanying map published by the Biological Survey. On the breeding range of the bird are superimposed, appropriately in black, the areas where nesting is now virtually eliminated by settlement, agriculture and drainage, and drought. The limits of shooting for sport are indicated by dotted lines. The principal shooting areas are in our east, west and gulf coast areas, and the Mississippi Valley. It is thus evident that, under the conditions now present, shooting is practically confined to sections outside of the breeding range. In fact, the gunners who have been principally responsible for the progressive decline of the redhead have always shot birds raised principally in other sections. Such is the case in Minnesota, and, if we had comparable figures in other states, they would doubtless reflect also a serious decline everywhere in the numbers of this unique and important species.

The redhead is one of the species that formerly contributed signally to the hordes that made the name Chesa-

peake Bay synonymous with waterfowl abundance, and luxurious sport. In the heyday of its abundance it was observed in rafts that extended for miles, and comprised many thousands. When it fed abundantly on wild celery, its flesh is said to have been scarcely distinguishable from that of the canvasback and it masqueraded as that prized species to an important degree. It was, therefore, one of the species prominently represented in the tremendous bags that were formerly made in that famous hunting area. But the days when such birds were so easily slaughtered that the slaves refused to be fed on ducks—even canvasbacks—more than once a day, have long since passed. Even in the days of the flintlock fowling piece the waterfowl began to diminish even in this populous resort; the destruction has been progressively severe, for the commercialization of market hunting, still far from extinct, has been eclipsed by the scarce less deadly development of shooting for sport, which has attained an eminence that justifies its being considered as a major industry, albeit one that is destroying its own source of raw material.

A few thousand birds—canvasbacks, redheads, or scaups—now occasion as much comment as did a million a generation or two ago, and furnish a text for the claim, voiced in varying degree from different sources, that the birds are as plentiful as ever—at least on the Chesapeake.

The main reason behind the claim that waterfowl are still abundant lies in the fact that ducks and geese are now reckoned in terms of dollars. In the days of real waterfowl abundance any energetic gunner possessing a skiff, a gun, and a few wooden decoys, could load his boat with ducks. But duck shooting nowadays calls for the investment of money. Club-houses, caretakers, boats, live decoys, grain for bait—these are a necessary part of the equipment. The waterfowl shooting of Chesapeake Bay is now claimed to bring upwards of a million dollars annually to Chesapeake waters. It does not take as many ducks to bring in the wealthy gunners' dollar as formerly, and as long as there are enough to support the industry, who cares? Certainly not those who reap the profit, be they gunners, helpers, or some state officials charged with wildlife preservation.

But when the ducks and geese are gone, it will be another story.

•

Shall Ducks Follow the Dodo?

THIS is the disquieting title of a thirteen-page brochure, illustrated by distribution maps, graphs and cartoons, prepared by the National Association of Audubon Societies, and just received.

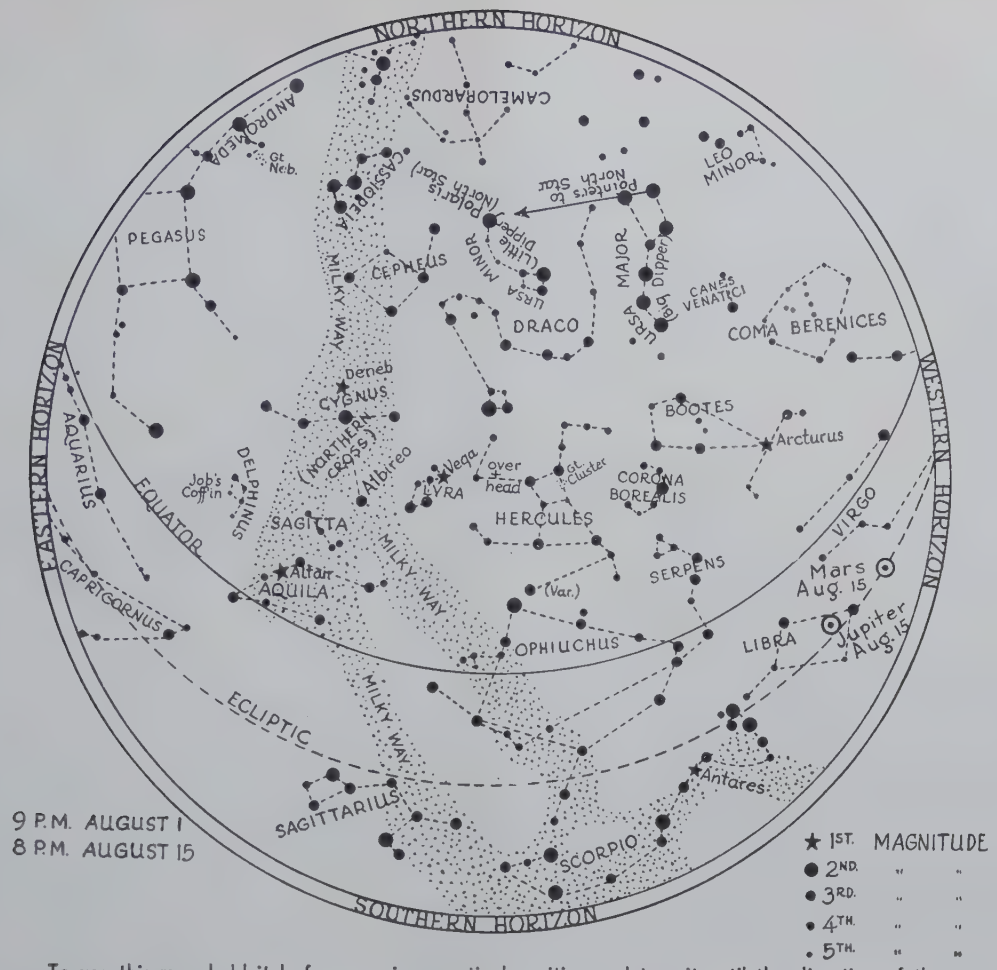
The keynote of this appeal for a closed season on waterfowl is outlined in the first paragraph; we quote: "J. N. Darling, Chief of the U. S. Biological Survey—who is in a more advantageous position than anyone else in the United States to know—estimates (Bird-Lore, May-June, 1935) that there are 18 to 20 million ducks left on the North American continent. Approximately 600,000 'duck stamps' were purchased during the 1934 hunting season. On that basis, for every licensed hunter of wild waterfowl in the United States, less than 40 birds remain."

The conclusion drawn from official statements—40 birds to each licensed waterfowl hunter—is enlightening. With the total supply down to about 20,000,000, we must conclude that the hunters have already had, and consumed, all the birds that are coming to them. We are a nation of 125 millions of people, and each of us has equal right to enjoy our national resources. Shall we surrender our waterfowl heritage to a mere handful of 600,000 hunters who have bought one-dollar "Duck Stamps"? Some of the more reasonable of the sportsmen have admitted that the birds and other wild life species belong in part to the non-hunters. We would now ask: What part? Shall we be satisfied with the tiny fragment of one duck that will be ours after the 600,000 annointed ones have crippled or killed, and perhaps eaten, such proportion of "their" 40 ducks as a beneficent government agency, charged by law with protecting and maintaining this public resource for all the people, has decreed that he may destroy? Is it not plain that not one duck should be killed until a surplus stock has been built up?

The line of attack is presented under: Commercialization, Drainage, Legal Hunting and Drought. Many of the arguments for a closed season that are ably presented have been already elaborated in NATURE MAGAZINE. The case for the birds is so plain that every plea for their relief has been advanced. Their pitiable condition itself cries aloud to those who have hearts to feel. What will be the result if the destroyers are again authorized to take toll from the twenty millions and their surviving offspring that this fall will come back from the north? It is unthinkable that a civilized nation will permit an atrocity an unlettered tribe of aborigines would scorn.

Under "Drought" are presented four maps—the breeding ranges as affected by drought of the Redhead, Ruddy, Gadwall and Pintail. We regret the briefness of the comment, for here lies the key to duck abundance. The three first mentioned breed mainly in the drought area, and are among those nearest to extermination. But the Pintail, with the Mallard, Canada Goose and Green-winged Teal, breed over a great area in the far North, beyond drought, drainage, commercialization or extensive hunting, and these are the principal ones that are now furnishing fodder for the guns. But the great area where they go to breed, somewhere between one and two millions of square miles, with myriads of lakes and marshes teeming with food, is now largely tenantless. This waterfowl paradise is now scarcely one-tenth occupied.

We hope that our readers, and every member of the National Association of Audubon Societies and its local branches, and every Nature lover in America who can be reached, will demand that shooting be forbidden.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

Meteors as a Hobby

By ISABEL M. LEWIS

SUMMER is the finest time of year to watch for stray meteors or "shooting stars," as they are popularly called, as well as the annual showers of meteors. Also, we may see the much less frequently observed aerolites, or meteorites, which are stones of such size that they escape being completely consumed by friction with the earth's atmosphere and actually fall to the surface of the earth. It is to this latter class that belong the siderites, stonyiron and iron meteorites that are exhibited in museums. These have either actually been seen to fall and recovered, sometimes while still hot, or they have been found long after their fall partly buried in the ground and identified as meteorites by their characteristic appearance and composition, which easily distinguishes them from stones of terrestrial origin.

Though one may expect to see only rarely the flight of a great fire-ball, or aerolite, which is generally accompanied by explosions, blinding flashes of light and detonations, and which may be visible for hundreds of miles over a long course through the earth's atmosphere, it is certain that a watch of an hour or so on any clear, dark night in summer will result in the observation of several meteors. If it happens to be at the time when a periodic shower of meteors is due many more may be seen. The presence of bright moonlight or nearby artificial lights will greatly reduce the number observable. The most meteors are visible in the early morning hours and the fewest in the early evening hours. This is because in the morning we are on the advancing side of the earth as it moves onward in its orbit around the sun and in the evening on the following side. The meteors we see in the morning are met "head on" and therefore are more rapidly moving and brighter than the night meteors, which are sluggish and reddish in color.

The meteors that travel in swarms are generally associated with some periodic comet. They are clouds of dust-like particles, weighing usually no more than a single grain, that travel behind the comet in the same orbit and

are encountered by the earth each year, when its orbit intersects that of the comet, and are swept up by its atmosphere. The friction produced by the passage of the meteor through the earth's atmosphere heats it to incandescence for a few fleeting seconds, and only in exceptional cases will the meteor escape being completely consumed by friction. It is possible that the great aerolites that fall to earth may be part of the head or nucleus of a spent comet, while the meteoric dust, called shooting stars or meteors, may be the finer part of the débris resulting from its gradual disintegration. Meteorites and even meteors may also come into the solar system from space far beyond. Results of the Arizona Expedition of the Harvard College Observatory and Cornell University include the discovery that a large percentage of meteors move with velocities of 125 miles per second with no definite radiants and are apparently coming into the solar system from interstellar space.

Meteors such as we observe flitting rapidly across the heavens on the summer night frequently belong to a swarm that has a well-defined radiant. This is the direction in the heavens from which the swarm is coming. The effect of appearing to radiate from a definite point is a matter of perspective. A number of particles traveling in nearly parallel lines in the same path and seen from a great distance—as is the case with a swarm of meteors—appear to move outward in all directions from a small area, or radiant. The name of the radiant connects it with the constellation in which it lies, or some bright star in the constellation near it. A great number of radiants are now known. A list of a thousand definitely recognized radiants of meteors has been published.

In the summer months we have, for example, the Gamma Draconids, which may appear on any evening during July and August. Their radiant lies just north of Hercules in the head of Draco. These meteors are slow-moving and generally leave a spark-like trail that rapidly disappears. There are also the Zeta Draconids, with their radiant near the star Zeta Draconis, which have their maximum display the last ten days in August and are bright and slow-moving. Then there are the Alpha Cygnids, with a radiant near the brilliant Deneb, or Alpha Cygni, swiftly moving and appearing in July and August. Another swarm has a radiant also in Cygnus, and are called the Kappa Cygnids. They appear between the tenth and twentieth of August and are bright and move with moderate meteoric speed. The greatest of all the summer meteors are, of course, The Perseids. The Alpha and Beta Perseids, which are swiftly moving and often leave behind them a faintly luminous band of phosphorescent light that lasts for some time, appear the last week in July and the first in August. The shower generally referred to as The Perseids has its greatest display about August 12, and its members are swift in motion. They may appear any time in July and August. Their radiant moves during this time from Andromeda through Perseus northeastward. They are seen in numbers after midnight in August.

Meteoric Astronomy is a field in which anyone who is interested in star-gazing and knows the constellations may do some valuable as well as interesting scientific work, if a careful record is kept of any unusual or remarkable flights of meteors, or the more rarely observed and more important flights of aerolites. There is in this country The American Meteor Society, and abroad active organizations for the observation of meteors and study of data gathered on the subject exist in England, Russia, Czecho-Slovakia and elsewhere. Valuable observations of meteors have been made in New Zealand, and observations of an unusually large number of meteors in Little America have been reported by the returning Byrd Antarctic Expedition.

The information that is most valuable, and that at the same time requires some considerable skill to obtain by observation, has to do with the location of the meteor and the length and duration of its flight across the heavens. One should note the date and time of the flight observed, in what constellation, and, if possible, near what known star the meteor was first seen, and where it disappeared. One should estimate the length of the flight, in degrees, approximately. As a yardstick one might use the length of the Big Dipper which is about thirty degrees. The duration of the flight can be estimated by counting seconds while observing the flight. Some observers begin to repeat some verse that requires a known number of seconds to recite as soon as the meteor is seen and in this way get a very good record of the time of flight. It is also of value to record color, speed, as fast, slow, or moderate, and whether a spark-like train is left or a luminous trail. The more unusual the meteor in size, brightness, length of flight, the more to be desired is accurate information on the points mentioned. In case of periodic showers of meteors counts of the number seen in a certain interval of time, the direction of their flight, and general estimate of color, brightness, and speed are what is most desired. One will be surprised at the skill that can be acquired with practice in the observation of meteors, as well as the familiarity with the constellations that will come as a by-product of the study of meteors. It is interesting to remember that Nova Herculis was discovered by a meteor observer and that a careful observer of the heavens may pick up a celestial treasure or a valuable scientific fact at any time.

All of the planets, with the exception of Mercury, which is not well placed for observation this month, are now visible in the evening. Venus attains its greatest brilliancy on August 2, but is low in the west, and will be too close to the sun to be seen the end of the month. Jupiter is due south at sunset on August 7, in Libra, and will be in conjunction with Mars on August 27. This planet is now rather low in the southwest and much fainter than Jupiter. It is receding from the earth. Saturn is in Aquarius, and in opposition with the sun on August 30, when it will rise at sunset and be visible all night. It is now in its best position for observation.

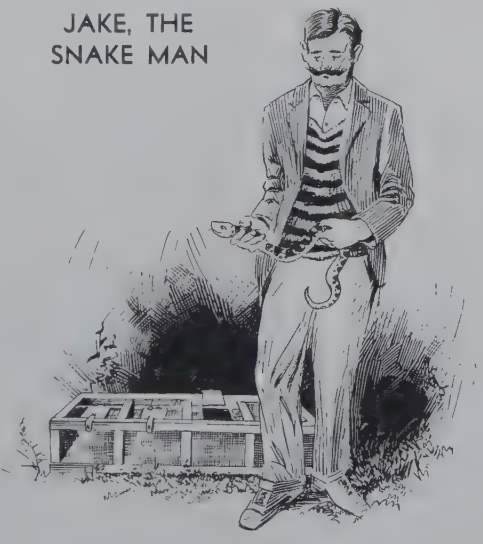
• • •

Trailside Treasures

THE REWARD

By JANE ADAMS PARKER

"WELL, well, look at this." Grandpa Arnold spread the village newspaper out on the porch floor, so the children could see the startling news, and began to read— " 'Real Live Bear Found in Arnold's Woods. The mere fact that the bear was muzzled, had a chain dangling from his collar, and belonged to a traveling circus, did not take away the thrill the children felt in seeing a big black bear walking up the trail. They had gone out in quest of treasures for their museum, and shortly before the appearance of the bear they had found a raccoon caught in a trap.' "



JAKE, THE SNAKE MAN

"But it didn't say the owner was so glad to get it back, that he's sending us something for our Treasure House," said Jerry.

"It's down at the garage now," said Aunt Dot, coming to the door. "It looks terribly thrilling too, a low crate of some sort, covered with a double wire netting."

Wondering and guessing what it could be, they hurried across the yard to a patch of lawn at the side of the garage. There a short, dark man with a big moustache was waiting for them beside the crate.

"I'm Jake, the Snake Man," he said grinning. "Mr. Lockwood sends his greetings along with these pets of his, and hopes you'll like them. I rode down on the truck so I could tell you their names and something to help you know them better."

The crate was divided into separate cages, with straw on the floor. In some of them was a low tub of water.

"Snakes!" cried Jerry. "Real live snakes!"

"I hate snakes," said Rosy, drawing back.

Jake looked at Rosy and some of the sparkle died out of his eyes. "That's all because you're not acquainted with them, my little friend," he said. "The more you know about them, the better you'll like them." He opened the top of one cage, and took out a yellowish-brown snake about a yard long, with chestnut brown patches edged with black. "Sometimes this is killed for a copperhead," he said, "by people who don't know the difference."

"We had copperheads down south," said Jerry. "And they're poisonous, too."

"But this one is only a milk snake or house snake. And he's perfectly harmless. Farmers think sometimes that he steals milk from the cows, when he's just sneaking into their barns to get the rats and mice. This one's a slender king snake. There are several king snakes, and beautiful ones, too. They crush their prey and then eat it. Some of the large king snakes can kill a big rattler this way. So they are fine pets to tame and keep about the place. Up here in this part of Illinois where you have so few

poisonous snakes, I think it a fine idea to learn all about the harmless ones first, so you can help protect them from people who might kill them."

"This is a hog-nosed snake," said Grandpa Arnold reaching down to pick up a snake with a queer turned-up snout. "He likes to scare people away by puffing up his neck and hissing, something like the way you puff out your cheeks and say, 'Boo.' If that doesn't scare them, he plays dead or pretends he's having a fit. But he'll make a nice little pet."

"And I know that's a garter snake," said Jo. "I can tell him by the stripes of yellow down his back."

"Yes," said Jake, "and he's a fine fellow to start your snake studies with. He has just shed his skin, that's why he looks so bright. Even the skin over his eyes comes off. A snake has no eye-lids. I'll tell you what, suppose you learn all you can about these snakes in this cage first. There are six or seven different kinds, all harmless and helpful. Then I'll stop in again as I go by and see what you've learned."

They all stood a moment waving to the Snake Man as he drove off. Then Rosy turned quite shyly to Aunt Dot and whispered, "I think that will be fun. Then we won't be so afraid of snakes when we meet them along the Old Trail."

Aunt Dot patted Rosy's sunny curls and smiled.

"And we'd better go up into Treasure House right now," she said, "and start getting things ready for our studies."

(To be continued)

•

The Cricket and The Coyote

(A Picurís Pueblo Indian Myth)

Retold by DOROTHY E. PLETCHER

ONCE upon a time there was a Cricket who lived far southwest at Kan' in' ai. A Coyote lived at Tcuxwetho'ai. One fine day the Coyote took a trip to Kan' in' ai to see what it was like. As he got to the place he stepped on the Cricket who was lying in the sunshine beside the road.

Said the Cricket to the Coyote: "Why don't you speak?"

The Coyote replied: "I do not speak to such queer looking people as you."

"Is that so?" chirped the Cricket. "Well, then, let's make a bet to see whose people are the stronger."

"Splendid!" said the Coyote. "Let us meet tomorrow by the river."

That night the little Cricket called his people together. Honey Bees, Bumble Bees and other winged friends who could sting, came from every direction. And that night the Coyote summoned all the four-footed animals who lived in the mountains. Wolves, Wildcats, Bears, Mountain Lions and all their relations answered the Coyote's call. Coyote told his friends of the bet he had made with the Cricket. "We will show the Cricket a thing or two," they roared, as they all marched over to the Cricket's town.

They stopped at the Picurís River and waited for the Coyote to go over to talk to the Cricket. "Are you quite sure you are ready?" asked the Coyote.

"Oh, yes, indeed," said the Cricket. "Just send your best man over here."

The Coyote then told his friends of the plan. He said that he would go over first. Proudly he set forth. And what do you think happened? When he got to the Cricket's house the Cricket sent all of the Bees after him. They stung him in his eyes, ears, mouth, and all over his body. The poor old Coyote tried to bite them, but it did no good. He had to jump into the water to get rid of those bees.

As he went back to his people he told them, "The Cricket's people certainly do have a great many weapons."

The Mountain Lion then offered to go to meet the Cricket's people, but the Bees stung him as badly as they had the Coyote. When he hopped out of the water, he told his people, "The Cricket has indeed beaten us. His people are much stronger than ours. My teeth and claws did me no good among the Bees. Whatever you do, do not go where the Bees live. All of you go straight home." They took his advice.

So the animals know how strong are the insects.

Taurus, The Bull

By JEAN H. BROWN

Taurus, the bull is a dangerous fellow,
If I waken at night,
I may hear his loud bellow.
I may hear the sound of the pound of his hoof,
As he stamps to and fro,
On the sky's dark roof.
With his long golden horns,
Which he tosses about,
The Hunter and Dogs,
He surely can rout.

I must look sharp,
And find if I can,
The Bull's fiery eye,
Aldebaran.

•

THE MOON

By G. FITZHUGH THOMSON

Some one is eating an orange;
See what a bite he can take!
And, look at the yellow peeling,
Fallen across the lake!

•

The Acorn's Cup

By FLORENCE H. MOORE

Within the acorn's cup,
The seed of an oak tree lies,
Which may raise its sturdy head,
High towards the skies.

Its roots spread deep and far,
Theirs the unseen, humbler task—
Just to hold a lovely tree,
Nor other work or praise they ask.

It takes so long to grow a tree,
But oh, so easy to destroy!
Let's help preserve the beauty,
That trees give us to enjoy.

So we'll be very careful,
When out to camp we go,
That no little sparks are left,
Where forest fires may grow.

PUZZLE: Find the loon and the children's pet lizard.

Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

The Forum editor acknowledges, with thanks, a limerick dedicated to his "Let It Rain" bulletin. He mislaid it in the rush of leaving for his Virginia trip, but recalls such lines as—

"Wet weather's not loathed
By one properly clothed."

Quite so. The bulletin contains much wisdom on this many-sided subject, as well as what clothing and equipment to buy and where. Price 3 cents to members, or 10 cents to non-members.

Brevities

Try a leaf "blotter" inside your cap on humid days. It reduces head and neck moisture. Select soft green leaves. . . . On the Sunday hike the foregoing wrinkle originated, a young woman wore a Jockey cap of brown corduroy. The tapering peak kept the sun out of her eyes. . . . The Carolina Mountain Club is giving two versions of the same hike—short and easy, and long and hard. More active members should be the outcome. . . . Appropriate alongside this is the definition of a "fireeater" by a Mountain Club of Maryland scribe. He is a fellow to whom a long hike is one over ten miles. . . . According to attractive year book just to hand, Prairie Club has a membership of 836. The all-day Sunday walks, although fewer in number than Saturday afternoon trips, drew the biggest turnouts in 1934. . . . Metropolitan New York hikers relish the excursion trains to tramping regions formerly too costly to reach. Deluxe among these specials is *The Rambler* of the N. Y., N. H. and H. to the Berkshires. Train has a recreation car, where inexpensive meals are served, and hiking accessories sold. Maps and group guides are with the company's compliments. . . . Fences and hikers fraternize to an unwanted degree. Only clothing manufacturers can enthuse about the barbed wire kind. 47 fences were encountered on a recent 8-mile hike of the Wisconsin Go Hiking Club. Two weeks later another leader produced a perfect hike—the fenceless kind. This month the Prairie Club will also conduct such an event. . . . "Come even if the weather looks unpromising," urges the Walther League Hiking Club (Chicago), "for in 45 miles there can be a great change." This climatic prediction works the other way equally well. . . . Nearly 400 miles of tramping trails are under the energetic control of the Connecticut Forest and Park Association, a voluntary organization supported by 1100 members. Each of the 17 local sections has a trail committee. . . . Busy June for Ernest A. Dench on the trail—two Interstate Hiking Club leads and one for a beginners' group from Brooklyn (N. Y.) Institute of Arts and Sciences. An oddity: Each conducted hike was in a different state—N. J., N. Y., and Pa. He also attended Seventh Appalachian Trail Conference at Skyland, Va. More later. . . . Who can match the California Alpine Club's record? The 17th annual "High Trip" takes place this month, with the High Sierra as the customary locale. The 30 to 60 participating members invest from $1500 to $3000 on this annual outing. Committee of 5 handles mass of detail, which includes hiring a pack train of horses or mules. . . . Mount Baker Club, Bellingham, Wash., recently celebrated its 10th anniversary. . . . Climbers and skiers in the Swiss Alps find adequate shelter facilities. In places 10,000 feet or better there are 164 huts and refuges. 199 ski huts are located elsewhere. . . . The Cascadians, Yakima, Wash., put on a conditioning hike this season before invading the higher mountains. Cascadians wore heavy-nailed boots and toted heavy packs as part of the conditioning plan. . . . Two New York clubs not partial to mixed memberships are the Fresh Air Club (masculine) and the Inkowa Outdoor Club (feminine). . . . Russell F. Schleicher, Palmerton, Pa., favors us with a manuscript in praise of the Lehigh Gap (Pa.) section of the Appalachian Trail. He is awed by the view over the Lehigh River. The toll charge is a breathtaking, watch-your-step ascent of some 500 feet. . . . *The Trail Blazer* is a good name for a club paper. It is used by the Trails Club of Oregon. . . . Potomac Appalachian Trail Club owns about 100 trail-working tools. No chance for idle hands here. . . . Camp cooking advice contributed by a Georgia Appalachian Trail Club correspondent: "The second piece of steak broiled on a forked stick over an open fire is always better than the first. A case of trial and error—mostly error."

More Gadgets and Accessories

No. 1. The Forum Editor highly recommends a tea compressed into pellets, which quickly dissolve in boiling water. Resulting brew tastes exactly like genuine tea, which it is. Worthless stem and midrib are removed in process of manufacture. Sold in hinged-lid tins of 100 or 200 pellets.

From the same source—a medical firm of international repute—comes a sweetening agent, which Forum Editor has not tested. Producers honestly admit it lacks food value. An intensely sweet preparation in tiny pill form.

No. 2. The night hiker traversing highways should take every possible visibility precaution. The latest aid is a flashlight with red signaling lens in the end cap. The lens, made of glass, reflects without using any battery "juice." Flashlight may be clipped to belt.

For navigating woodland paths at night the same firm has a compact spotlight with a small compass built in the rear cap.

No. 3. A camp cooking outfit for a party of two weighs only 3 lbs. and is 5½ inches high when nested. Six pieces are of aluminum. Frying pan has a patented folding handle. Old, established eastern sports equipment house evolved the efficient combination for the camper who wishes to travel reasonably light.

No. 4. A famous watch company claims to have built a moisture-proof wrist watch, designed for strenuous service on the trail and in camp.

No. 5. A taxidermist is branching off into the marketing of hiking and camping requisites. He will specialize in those not easily obtained elsewhere. As a starter he offers a size range of 7 Adirondack pack baskets. The smallest, 10 inches high, 1 peck capacity, is suitable for a child. Ladies can obtain a basket, 15 inches high, 3 pecks capacity. All are Indian made. Waterproof canvas cover (removable) may be had to fit any size basket.

No. 6. Those partial to golf knickers for hiking and camping may find replacements difficult because of the slacks vogue. Forum Editor knows of a mail order sports equipment firm closing out this line at a liberal reduction.

No. 7. A slanted back rest—wooden frame with cloth cover—should appeal to he or she who wishes comfort while loafing on the grass or beach.

This company also makes a short-legged table suitable for a pasture or beach set-up without the use of chairs for seating. Table packs up like a small suitcase, with room inside it for two vacuum bottles and other beverage accessories.

No. 8. A wire goods house specializes in campfire cooking devices. One of these is a fork with an interlocking extension, claimed to be foolproof. Fork is 19½ inches long when carried in pack, but can be extended to 30 inches while in use.

A stamped, addressed envelope will secure further details of above products, with sources of supply.

Adirondack Information

The two Adirondack camps maintained by the Adirondack Mountain Club at John Brooks and Heart Lakes accept overnight guests at $3.50 per day, American plan. Both camps are conveniently located to Marcy and other high peaks. Further information is available by writing Box 59, Capitol Station, Albany, N. Y. The ADK has four chapters in operation, but contemplates additional ones in New York state. *High Spots,* the quarterly ADK magazine of 40 pages, publishes a wealth of information about the Adirondacks. Non-member subscribers may obtain it for 50 cents yearly.

No Roads For Them

Highway walking is rightly frowned upon by the appropriately-named Trails Club of Cleveland, Ohio. The monthly hikes, each averaging five miles, are confined to the wilder sections of Metropolitan and State parks. The varied going includes cutting through woods, fields and over hills by compass, and the use of maintained trails. The Committee form of government prevails, with Thomas R. Connor as chairman. Dues are only 25 cents yearly. The T. C. was launched last December.

Philadelphia's Fourth Club

The Forum Editor slipped a cog in omitting the Nature Ramblers from his recent listing of Philadelphia hiking clubs.

The Nature Ramblers bravely started out March 4, 1934, with 8 members; today

(*Continued on page* 124)

Historical Tree Grove

Under the inspiration of Mrs. Walter C. Talley there is growing in Peoria, Illinois, an interesting and inspiring historical grove of trees. Mrs. Talley conceived the Talley Historical Tree Club, and in a section adjoining the Old Settler's Log Cabin Memorial in one of Peoria's parks trees are being planted in memory of individuals and events in American history. These trees are not confined to Peoria, or even Illinois, but any individual or group wishing to commemorate some historical event may do so by sending a native tree to be planted in the memorial grove. Mrs. Talley's club will see that it gets into the ground and is properly cared for. Space does not permit further details but these may be obtained from the Talley Tree Club, 412 Maryland Avenue, Peoria, Illinois.

Killdeer Steals Show

Batteries of newsreel cameras were in readiness and railroad officialdom on hand for a special showing of the new high-speed locomotives of the Baltimore and Ohio Railroad at Halethorpe, Maryland. They were to be run over the test tracks for the benefit of cinematic posterity. Before the festivities were to start a mother killdeer set up a commotion and, simulating injury, attempted to lure the intruders away from her nest, which was discovered in the rough ballast between the tracks. Four unhatched eggs lay between the rails, and some bird lover in the group warned that to move them would mean disaster to the future killdeer family. So some yellow chalk was used to mark the place and when the engines were run down the track the engineers ran slowly over the spot, while Mother Killdeer stood beside the track and scolded the iron monster. The affair over and the crowd gone, the mother returned to her nest and was still there the following day.

Paul Bunyan

Paul Bunyan, the Munchausen of the lumber camps, is a leading figure in American folklore. His weird tales are fascinating reading and rich humor. The Red River Lumber Company of Minneapolis and points west has just sent us a little booklet of Paul Bunyan stories entitled *Paul Bunyan and His Big Blue Ox*. It has run through several editions. We do not know on just what basis it is available except that an accompanying letter says that it can be purchased at ten cents a copy in lots of one hundred or more.

New York Plants

Botanists, lay and otherwise, residing in the region of New York City will welcome the handy little volume entitled *Plants of the Vicinity of New York* by Dr. H. A. Gleason, Head Curator of the Museums and Herbarium of the New York Botanical Garden. This little guide of 198 pages, pocket size, is published by the New York Botanical Garden. It is purely and simply an identification guide and will, we suspect, be found in the pockets of many hikers and flower lovers around the metropolis. The price is $1.65.

WAUMBEK HOTEL

In the White Mountains at JEFFERSON, N. H.

Situated on a 2000 acre estate of landscaped grounds, flower gardens, virgin forests and recreation areas which include one of the finest 18 hole Golf Courses in the mountains.

Saddle Horses, Tennis, Polo Ranch and the famous Soreno Orchestra for concerts and dancing.

A well arranged calendar of events insures freedom from dull moments. *Attractive Rates for July.*

SORENO LUND, JR., Manager
Winter—Soreno Hotel, St. Petersburg, Florida

SUMMER RESPITE

Imagine yourself facing the Atlantic from an ocean deck of The Dennis, with fresh breezes cooling your brow! Your own room looks out over the sea and you sleep with the murmur of waves in your ear.

Give yourself this Summer Respite and the contentment of fine living at The Dennis. We'll have your room ready if you'll write us now!

5,000 Sq. Feet of Ocean Decks
Bathing Direct from the Hotel
Health Baths—Diet Kitchen
produce from the Dennis Farms

HOTEL DENNIS
ATLANTIC CITY, N. J.
Walter J. Buzby, Inc.
Write today for new, illustrated booklet
On the Boardwalk
3 sqs. from Union Terminal & Auditorium

FREE *WRITE FOR* **BOOKLET NO. 652** *on the practical removal of worms in Dogs of all breeds and ages.*
FOR DOGS
NEMA
(TETRACHLORETHYLENE C. T.)
WORM CAPSULES
effectively remove
Large Roundworms and Hookworms
Dependable, safe, easy-to-give worm treatment. Helps keep your dog thrifty!
For Free Booklet write to Desk N-21-H Animal Industry Dept.,
PARKE, DAVIS & CO., Detroit, Mich.
Drug Stores Sell Parke-Davis Products

3000 OUTSIDE ROOMS 3000 BATHS 3.00 UP
Special Apartment Floors for Permanent Guests

PULVEX
FLEA POWDER

Actually **KILLS FLEAS** *instead of Merely Stupefying them*

Pulvex Flea Powder not only kills all the fleas and lice on your dog or cat but *its deadly killing action continues for days*, preventing reinfestation. Dusting twice a month insures your pet constant immunity from the torments and the tapeworm perils of fleas. Harmless, even if swallowed. Non-irritating. Odorless. Sold on money-back guarantee to "kill them off—keep them off" by pet shops, drug and department stores, in shaker top cans, 50c, or direct from William Cooper & Nephews, Inc., 1948 Clifton Avenue, Chicago, Ill.

GIVEN ..WITH EVERY CAN OF PULVEX FLEA POWDER

1935-36 Edition Now Ready
40 pages of School Magazine Bargains, Special Subscription Rates, Short-time offers —Lowest Prices! Mailed free to Schools and Teachers only. Send 6c for first-class postage. Agents wanted everywhere. Write for information. **Dept. N.**
DELONG SUB. AGY. LAFAYETTE, IND.

Hiking and Camping Forum

(Continued from page 122)

there are more than 250. A determined "Meet rain or shine" policy, the organizing ability of Director D. K. Betts, varied types of hikes, and pay-as-you-hike dues (10 cents a trip)—and you have the reasons for its rapid growth. Club activities have a vehicle in a quarterly mimeographed publication, *The Rambler.*

Mr. Betts takes a courageous stand on the issue of either hiking cross-country or on highways. The Forum Editor agrees with Mr. Betts that—"Road walking is extremely dangerous. . . . It is hard to please all, but I would rather have a group of cross-country walkers who were naturally tired out at the end of a trip, than start out with ten and return with nine."

The serenity and enjoyment of Nature to which the hiker is entitled are not found today along a ribbon of macadam or asphalt.

Two Magazine Annuals

Although dated February, the annual magazine issue of the Sierra Club Bulletin did not appear until late May. Editorial board, headed by Francis P. Farquhar, did a very satisfactory job—one which atones for the delay in publication. Western mountaineering achievements are, in the main, reviewed by those responsible for them. The regions described in type have their photographic counterparts—24 full pages of them on art paper. This noted annual is sold at 75 cents a copy by the Sierra Club, 1050 Mills Tower, San Francisco, Cal.

The American Alpine Journal is approximately the same size as its western contemporary, yet is priced at $1.50 a copy. Naturally, the contents cover a wider terrain, although the Canadian Rockies, Austria and the European Alps occupy the lion's share of space. Photographs are smaller—two to a page. The American Alpine Club is located at 140 W. 46th St., New York, N. Y.

Being Kind to the Inner Man

In a recent issue of *Trails* (California Alpine Club monthly), Sam S. Rosen summarizes his gleanings from innumerable government food bulletins. He did it with hiking-camping requirements in mind.

Only such liquids and semi-liquids as pure honey, raw egg, clear beef juice, water and lemon juice will digest within five minutes. There is a yawning gap of 55 minutes to the next selection of digestibles, which take in celery, milk, almonds, chestnuts, apples, dates, figs, olives, raisins, sugar, pure cocoa, boiled egg yolk, vegetable soup, chicken broth and young lamb. All of these are suitable for lunch, if an hour or more is allowed for the meal.

Next lists are exactly one hour apart, concluding with such five-hour digestibles as fried eggs, oily nuts, fried ham, old cheese and hard boiled eggs. Obviously they belong to the evening meal in camp.

Rosen makes no mention of that faithful trail pal, chocolate.

The standby of Dr. Paul Spangler, when needing a quickly-digested food to replace energy depleted on a climb, is plain lump sugar. He expounds its merits in an article contributed to Bulletin No. 3 of the Federation of Western Outdoor Clubs.

British Footpaths by Proxy

A subject of herculean proportions compressed into 120 pages is *Walking in England.* It vibrates with the author's restless personality. You look in vain for conventional tours, as Geoffrey Trease roams among the lesser-known hills and dales, even in the popular resorts. Trease snubs the clubs and is even out of patience with clothing and equipment tips. Sign up with Trease and—"Walk! Anyone can walk. Don't be put off by the High-Priests of Hiking. You will learn most by your own blisters." It's a lively three shillings worth, this book, published by the Fenland Press, Wisbech, England.

In contrast to the above is the pleasing but conventional pot pourri of hiking and Nature study under the caption of *The Rucksack Way.* Month by month Arthur Sharp tells you what to take along, where to go, and what to smell, hear, feel and see while exploring the English countryside. More of the excellent photographs reproduced would have increased the book's appeal to the overseas reader. Published in London by Herbert Jenkins, Ltd., at three shillings and sixpence.

George Pratt Insh made his hobby within a hobby yield a fascinating series of rambles in all seasons. He traced, on foot, the River Clyde from industrial Glasgow to its mountainous source. A readable account of his experiences is within the covers of *The Elusive River,* obtainable from Grant and Murray, Ltd., Edinburgh, at six shillings.

Feeding a Large Party

The Black Hawk Hiking Club, under the organizing genius of John H. Hauberg, has conducted a "Big Hike" for fifteen consecutive summers. The duration is from eighteen to twenty-one days, with from forty to fifty in the party. Transportation is by truck, but the overflow is accommodated in private autos. Seven to ten days are spent in strenuous hiking and mountaineering. Rest of time is devoted to sightseeing en route.

No tents are carried because of bulk. Sleeping bags and blankets are used instead. Inclement weather may suddenly arise, and transportation may break down, but what must *not* fail is the providing of three square meals a day.

Mr. Hauberg stresses simple but wholesome meals, which are prepared by experienced amateurs on an open wood fire. "I have seen experimental broiling and other demonstrations on trips like ours," cautions Mr. Hauberg, "which were risky ventures. The perpetrator should practise them before leaving home. There will then be no uncertainty, either to the manner of preparing, or its effect on the unfortunate diners."

This Rock Island (Ill.) camper-hiker is the author of a privately-published book, *The Big Hike for the Summer Vacation Period.* In it he gives others the benefit of his wide experience. Starting in with enough cooking utensils to stock a hardware store, Hauberg has finally whittled the outfit down to essentials. You can efficiently prepare outdoor meals for from forty to fifty people with six or seven galvanized buckets (12 and 14 quart size), and five or six frying pans (10½" at bottom kind). It keeps the weight down to about 30 lbs. Other essentials are a butcher knife, dipper, several pancake turners, two big spoons and a can opener. All the items, nested, will fit a corrugated container.

Black Hawkers have never found an outdoor breakfast to equal Mr. Hauberg's specialty—French toast, syrup and coffee. Hark now to Chef Hauberg: "We stir up a lot of eggs, add milk and salt, and then enough water to eke out the materials. Into this you dip a thick slice of bread and fry it in *hot,* sizzling lard. When a beautiful brown, turn the slice over and repeat the process. Before eating douse the bread with syrup."

Where First Descents Prevail

A freakish country, even in mountains, is Australia.

The Blue Mountains of New South Wales form a series of plateaus. You can ascend a plateau only at the easy end. Suppose you seek a sporty climb of a crag midway along the plateau. It will resist your most skilled efforts—and that goes for roping, too. But you can climb *down* it with ropes.

The explanation is a flat-topped range, with the upper cliff face of unclimbable sandstone. The mountains rise about 2000 feet above the valleys.

Sydney, the State's largest city, is an active hiking center. There are ten clubs affiliated with the N.S.W. Federation of Bush Walking Clubs, who are promoting a Blue Mountains National Park scheme. The same story the world over—civilization inroads ruthlessly wiping out the wilderness.

President Walter J. Roots favors us with a copy of the Sydney Bush Walker Annual, published by the club of that name. An enlightening collection of articles and photographs. Odd to find the first descent of one difficult peak chronicled with the importance of an upward achievement—but that's Australia all over.

Iowa Enterprise

The Sioux Hiker is only a foolscap sheet, mimeographed both sides, with copy well arranged on each double-column page. Editor Gladys Cassidy packs a cargo of good things in limited space. The Sioux City Hiking Club, of which A. C. Johnson is president, was organized two years ago, and now has nearly 100 members.

Fish Book Reprinted

Long out of print, David Starr Jordan's *Classification of Fishes* has been reproduced by lithography by the Stanford University Press and is once more available. It sells for $3.50 bound in paper and $4.25 bound in cloth.

CLASSIFIED

COLLIE PUPPIES

WHITE COLLIE PUPS the most beautiful specimens the dog world can offer. Home guards, loyal companions. Stamp for Catalogue. **Comrade Farm Kennels, Galion, Ohio.**

IRIS

FREE IRIS—Fall-bloomers and others given for flower-lovers' names. Details free. Dept. NM, Melvin Geiser, Iris Specialist, Beloit, Kansas.

PEONIES

TREE PEONIES, finest named blooming varieties. Herbaceous Peonies, best varieties. Oberlin Peony Gardens, Sinking Spring, Pa.

PHOTOGRAPHIC

INCOME from your camera instead of expense. Low-cost, home course teaches you to make photographs for magazines, newspapers, advertisers. Tremendous demand. Earn good money wherever you live. Free book. Universal Photographers, Dept. C, 10 West 33rd St., New York.

SEA SHELLS

FORTY different California sea shells classified $1 buyer paying postage. Price list other marine life. **Tom Burch, 4031 Oakwood St., Inglewood, Calif.**

SNOWDROPS

BURPEE'S SNOWDROPS. 6 guaranteed bulbs (value 30c) sent postpaid for only 10c; 65 bulbs postpaid for only $1.00. Earliest of Spring flowers. Burpee's Bulb Book, free. Best guide to Fall planting. W. ATLEE BURPEE CO., 844 Burpee Bldg., Philadelphia, Pennsylvania.

6 BULBS 10c—VICKS SNOWDROPS, earliest spring flower, blooms outdoors before snow is gone. Plant this fall. 6 bulbs (30c value) postpaid for 10c; 60 for $1.00. Vicks Bulb Book free. JAMES VICK, 641 Vick Building, Philadelphia, Pa.

SONG WRITERS

NEW DEAL. Write Sequoia Songwriters Service, Sherman Branch, Los Angeles, Calif.

SPIDER

BLACK WIDOW SPIDER. Complete life history, mounted. $2.50. **Maynard, 1192 Lewiston, Rochester, N. Y.**

Have you any WILD FLOWERS in your garden?

These wildings of the woodland add an exotic charm to the shaded corner or the spot you had not known how to treat.

BUT to grow wild flowers you must know their needs of soil and care. Many of our rarer wild flowers have become so because they have not been gathered with care. Seeds of many are now available, and you may wish to save a clump of some kind threatened by the steam shovel, the road builder, or the woodsman.

IF you do you should know your wild flowers. You will find this knowledge in text and in many pictures in

PIONEERING WITH WILD FLOWERS

an attractively written, fully-illustrated book based on a lifetime of study and experience raising wild flowers.

Send Two Dollars to

BOOK DEPARTMENT

AMERICAN NATURE ASSOCIATION

1214 16th St., Washington, D. C.

A Correction

Our attention has been called by a reader of NATURE MAGAZINE to the fact that the illustrations for the first edition of *An Island Garden* by Celia Thaxter were by Childe Hassam, the painter, rather than by Mrs. Thaxter. (The plan of her garden is hers—see "Letters," p. 207.) The book is out of print and hard to obtain, and we had not seen the 1894 edition, our own copy being the unillustrated edition of 1904. The correction, however, serves to bring out an interesting fact. In Nelson's Encyclopaedia we are told that Mrs. Thaxter *"was accustomed to illustrate separate copies of her books with flower and marine views for those who wished them."* The National Cyclopedia of Biography also refers to this kindness of the author to her friends. Mrs. Thaxter's painting was in water colors and much of it was on china and tile. Of the winter of 1877 she writes that she painted "one hundred and fourteen pieces for different people,—cups, saucers, plates of all kinds, a great deal of immensely careful and elaborate work." ("Letters," p. 86.) Mrs. Fields refers to her wonderfully accurate memory and says that she was able to paint flowers without the originals with every shade of color recorded.

Astronomy Text

Dr. Robert H. Baker, Professor of Astronomy in the University of Illinois, is the author of the latest astronomy text to come to hand. It bears the descriptive title, *An Introduction to Astronomy,* and lays a complete basis for astronomical knowledge for the student in senior high school or college. The author has achieved a splendidly systematized text which admirably combines simplicity and scientific completeness. He has prepared the work for the student but has not, as is often the case, tried to sugar-coat his subject to make it easy to take. Astronomy is so full of fascination that it should not be regarded as an academic dose. His work is also an excellent one for library reference purpose. The publishers are D. Van Nostrand Company and the price is three dollars.

Aquarium Fishes

We do not imagine that anyone interested in tropical aquarium fishes will be able to resist *Exotic Aquarium Fishes* by William T. Innes. In fact, we suspect that one would be willing to go without lunches for a week to add it to the library. Here is a thorough and beautiful book, illustrated in black and white and with lovely color plates, treating with the exotics of the home aquarium world. We ourselves have never been able to afford the time and money to indulge in this hobby, but we were fascinated in reading some of Mr. Innes' information about these fishes. For example, the *Betta splendens*—or Siamese fighting fish—information is as interesting as a good short story. And the manner in which the little orange chromides suspend each egg by a tiny thread was only one of the many surprising facts we found in this volume. Mr. Innes is also a printer, and he has not only been able to combine his business with his tropical fish avocation but has been able to live with the production of this work from manuscript to bindery. The price is five dollars.

EASTMAN'S FINEST MINIATURE CAMERA

Continental Precision at a Domestic Price

$57.50

KODAK RETINA incorporates every worth-while miniature camera development—yet it costs about half as much as other cameras of similar range. Before you buy a miniature camera—check these features, check the price. Then see the Retina at your Kodak dealer's.

36 EXPOSURES
. . . without reloading. Film comes in daylight-loading magazines. Pictures, about 1 x 1½ inches, readily enlarged.

FILM SPACER
No overlapping pictures—no wasted film. Film automatically stops at right spot in winding—indicator shows the number of pictures.

FAST (f.3.5) LENS
The big, precision anastigmat lens admits ample light for fast action pictures . . . lets you make candid pictures indoors in good light.

1/500 SHUTTER
Snapshots up to 1/500 second, accurately timed by the Compur-Rapid shutter. Eight other automatic speeds as well as "time" and "bulb."

COMPACTNESS
Folds flat, no projecting front. Only 4¾ x 3 x 1½ inches over all. Unobtrusive spyglass finder always ready for action.

LOW PRICE
Sturdy, precision construction, yet it costs about half as much as other cameras of similar range. Eastman Kodak Company, Rochester, N. Y.

KODAK RETINA

When is the best time to Plant?

Will it grow best in sun or shade?

What soil does this plant like?

How do I combat this plant disease?

WHERE DID I READ THAT?

How often have you wanted some information on garden subjects and couldn't locate it at the time most needed.—Of course you read about the very thing you had in mind and you fully intended to clip the article out and save it for future reference.—You either misplaced the clipping or entirely failed to save the information for lack of a convenient place to keep it.

Garden Scrap Books

Will solve your problem. These books have been especially made for people who take a keen interest in their gardens, flowers, shrubbery, etc. But they may be used for preserving other data as well.

Manufactured in Two Convenient Sizes

Book No. 2331, cover size 11 x 9 . . . Price $1.00

Book No. 2330, cover size 14 x 10¼ . . . Price $1.50

Beautifully bound in Brown shaded Mission grain Pyroxylin coated washable material, called Texoloid—a good genuine leather substitute. The covers have closed backs and are demi-flexible. THERE IS A GARDEN GATE DESIGN IN COLORS ON THE FRONT COVER, together with the embossed title "SCRAP BOOK."

Fifty (50) manila drawing paper leaves specially made for scrap book purposes provide ample space for your clippings. And the silk, tassel-tipped laces, which pass through the telescopic expanding posts and hold the leaves, enhance the beauty of the Book.

This is the Scrap Book for which you have been looking to preserve clippings and other data in reference to gardens.

Send your order today—Your money refunded if you are not more than pleased.

NATURE BOOK DISTRIBUTORS
1212 Sixteenth Street, Washington, D. C.

Enclosed find (check or P. O. money order) for $..... in payment of Scrap Book No. ..... Please mail it post paid to the following address:—

Name.....

Street.....

City and State.....

The accompanying essay was written by Kenneth Leins, age 12 years, a pupil in the sixth grade of the Narberth Public Schools, Narberth, Penna. It was inspired by a week-end hike through the woods. Narberth is a suburb of Phila. surrounded by some "open spaces," which give opportunities to boys and girls for practical nature study. A systematic course of study in the schools is based on three principles: (1) Nature study should be taught throughout the year, on a seasonal basis, (2) Nature study should correlate very closely with the Geography work, (3) Direct observation and practical work should be the foundation for "living" Nature study.

A Trip into the Woods

As Sunday seemed to be a good day for a walk, I thought that probably I should go through the woods to see what activity Mother Nature had started. As I entered the woods, I did not notice anything on the trees at first as they looked bare and dead from a distance. When I got closer, I noticed that the buds were beginning to open, putting a new life to the trees. The ivy and vines were also beginning to get a brighter green. The button-balls were still hanging on the trees from the year before. In a small tree which was almost entirely covered with lifeless-looking vines, I found an old bird's nest. I did not know what kind of bird's nest it was. It was hardly noticeable through the thick entanglement of the vines. Further on I found some pussy-willows. On the rocks and banks I found some moss that had turned from a dark green to a beautiful light green. Later on my dog Boots who was along with me routed out a small snake from its hideout. (I'm glad mother wasn't along.) In small clumps there was scallion grass growing scatterlike about the ground. On some of the trees I found some vines which clung to the trees by thousands of small hair-like roots. They were parasitic vines. All around me grew many wild rose vines which were a beautiful red, and very picky. As I went on through the woods, I came to an old creek bed, which of course had been dry for a good many years. Beside the creek bed there was an enormous tree, which was dead. It was very beautiful the way it stood so rugged and worn against the beauty of the other trees. In parts it was hollow and slightly charred by fire at the foot of the tree. Further on, among the trees I found a lean-to shelter, which was probably built by Boy Scouts. Nearby there stood a young tree which was twisted like a corkscrew in the center. This was probably done by a vine as it twisted and wound about the tree. The vine was not on the tree when I saw the twisted trunk. Later I found a stump at which I stopped to try to count the rings to find the age of the tree. By my count it was about sixty-five years old. Another one I found and counted was about seventy-two years old. Later I found some vines, which were of good size and found that if I gave myself a big enough push, I could have a ride on something that was first degree nature. Down the hill by a small stream or creek in a swampy part of the ground, I found what I thought was young skunk cabbage and the remains of an old tree which was of a dark, rich, but beautiful red. It was sort of soggy and when I touched it, it crumbled apart. In the creek I found many rocks of beautiful shapes and colors. There were a few other rather old and soggy logs in the water, while along the banks there were huge boulders, some of which probably weighed many tons. Among the trees that I noticed were button-balls, wild cherries, maples, bayberry bushes, pussy-willows and many others. On my way home I made bitter enemies of the wild roses, as I found that each step I took, they gave me a good scratch and they weren't easy scratches either! From this trip I learned a good deal more about nature and I was able to prove all that I had learned from my work at school.

Bird Vignettes

By Anna E. Jorey

The most unusual sights in the bird world are lost to the casual observer. One living in the country has opportunity to observe closely those feathered bits of color, song and beauty with their very human characteristics.

Four crows marching a foot apart; marching, then bowing, marching, then bowing, with the utmost seriousness. A male indigo bunting shelling peas and eating them is a sight worth many an hour of quiet waiting. Really comical is the ruby-throated humming bird when once in a blue moon he sits, and fourteen nearly grown cedar waxwings fitting one small bird bath without apparent discomfort. Nothing could be more graceful than a band of fifteen hawks journeying South as they glide in ever higher and wider circles slowly and soundlessly.

Of almost unbelievable beauty were seven male scarlet tanagers in an immense Carolina willow, their red color flaming against the dark green leaves. And not less so the male rose-breasted grosbeak with its distinct rose, white and black garments in its courting dance flirting and fluffing out its feathers to twice its natural size for the edification of the female. The white-throated sparrow in his more somber clothing adorned with its white neckpiece, such a contrast to his gayer coated brothers, has an amusing way of sticking out his chest and invariably singing in a high pitched whistle "pea-bo-dy-bird" when he wins a fight.

Even such a seemingly prosaic bird as the female English sparrow can show amazing ingenuity. The neatness and dispatch with which she rid herself of an undesired suitor by taking firm hold of a feather at the back of the neck, holding him suspended a full minute while he swung back and forth in a half circle, then dropping him deliberately and disdainfully, leaving him a crestfallen but wiser bird, was most commendable. A remarkable display of heroism was shown by a pair of chewinks when their baby daughter's life was threatened by a five-foot black snake. The mother fluttered frantically over the enemy to distract his attention while Daddy Chewink hustled the baby out of the danger zone.

A pair of bluebirds afforded a whirl of color as they battled for the love of a lady. So intent were they, I could almost have touched them several times, but as I reached out a hand, the female warned them. One late afternoon I came beneath a tree in which a hermit thrush was singing. I was equally happy to see and hear one in its home.

To one who is willing to exercise patience and yet more patience, to be quiet, to seek out meadows and woodlands off the beaten trail, there opens a world of fascinating study with every hour a joy and a delight.

Four Leaf Clover Club

By Isabelle French

Born about a year ago in the school of Stambaugh, Michigan, this club has grown and developed like a healthy child, ever in quest of the new and different. It now enrolls more than fifty members. Every Tuesday, promptly after dismissal, meeting is called to order. We sing "The Four Leaf Clover", words written by Ella Higginson. The library committee reports on books and reference material where interesting information may be secured. The program consists of talks by students including personal experiences. Hikes have greatly enriched our club. One time last spring we had watched the birds at breakfast before partaking of our own. Time passed and we were wanting to adopt the woods for the day, but lo and behold, dynamite workers suddenly interrupted our pleasures and we flew like the birds we had been watching.

The fall months were full of interest. No insect was safe near the eyes of a Four Leaf Clover member. Once spied, especially be it different, it was captured and made the center of attraction. One lowly worm, who boarded on dill leaves, never could have dreamed that his life cycle would be a spectacle for many. He eventually became a beautiful, black swallow tail butterfly.

Trees did not escape our study and were pleasant hosts on our field trips. Nor did they object to our burning their dried leaves for our wiener roasts.

We happen to have an interesting country for studying rocks. Copper and iron ore, quartz, shale, iron pyrites, and sandstone, we walk on daily. A chemist from a mine increased our knowledge concerning these rocks.

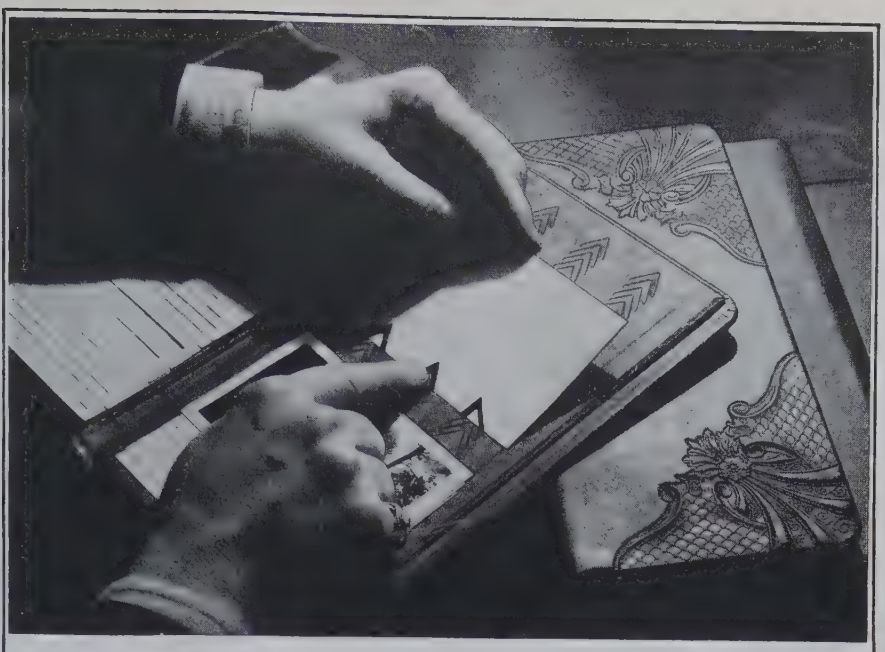
Our inquisitive minds have discovered not much, as yet, about the water animals except to note that the turtles bite off the tails of the salamanders if they are made to live together in schoolrooms.

Nature Magazine was our aid in studying the stars and constellations and we were able to discern some of the larger ones without the help of a telescope. We gathered at the skating pond and afterwards sipped cocoa with marshmallows.

In studying things of miscellaneous interest invariably articles came from Nature Magazine. We enjoyed the water bug and rarely missed the animal myths.

Four-book Group

The latest addition to the list of school Nature Study texts to come to our attention consists of a group of four books under the title of *The Nature Hour*. They are the result of collaboration between Lucille Nicol, Samuel M. Levenson and Teressa Kahn, all of the New York City School system. Two volumes are designed for the fifth school year, and two for the sixth. For each year one volume is devoted to Spring and the other to Autumn and Winter. The fundamental idea in these texts is to stimulate observation. Each chapter is designed to provide material for one month's work, and there is a sufficient variety embodied in the chapters to permit the teacher to exercise a considerable range of selection in the material used. Some excellent and interesting color pictures have been done specially for this series by Roger Tory Peterson. The publishers of the group are Silver, Burdett and Company.



Mount Your Photos This Wonderful Way!

Many on a Page—No Messy Paste!
Quick, Neat and Attractive

THE Fotofolio

is a new, attractively styled portfolio, introducing the most modern and effective method of mounting photographs. At last, it is a joy and a delight to mount your snapshots and photos. No messy paste—the little gummed tabs are always ready for instant use. No trouble, no fuss, no bother as with the old-fashioned album. Your photos are always where you can find them, neatly mounted, many of them on a page, and all instantly available for inspection. You'll love the Fotofolio—it is so simple, so practical, so sensible and so beautiful.

THE FOTOFOLIO IS MADE IN TWO SIZES

No. 2 size holds 100 prints
2¼ x 3¼, or 2½ x 4¼, or 3¼ x 4¼
No. 3 size holds 100 prints
2⅞ x 4⅞, or 3¼ x 5¼, or 4 x 5
or 200 prints 1⅞ x 2½

Size No. 2		Size No. 3
7212 Price $1.00	Binding assorted Morocco grain Texoloid. Colors Black, Brown, Green. Modern blank stamped gold foil title.	7213 $1.25
7162, $2.00	Binding Alligator grain leather. Blank border lines and gold title. Black only.	7163, $3.00
7182, $3.00	Binding Florentine finish cowhide leather. Padded covers. Blank embossed band, hand tooled effect, with shaded background. Colors Mission Red, Green and Brown.	7183, $4.00
7382, $5.00	Binding Florentine finish cowhide leather. Embossed and colored corners, hand tooled design. Colors, Antique Brown, Green, Red.	7383, $6.00

MONEY-BACK GUARANTEE

Select your size, number and color, fill in and mail the coupon below. You run no risk whatever—your money will be promptly refunded if you return the Fotofolio—no red tape. But you'll not want to return it.

NATURE BOOK DISTRIBUTORS, 1212 Sixteenth Street, N. W., Washington, D. C.

Please mail me postpaid Fotofolio No. ..... Color ..... My check for $..... in full payment is enclosed.

Name .....

Street & No. .....

City & State .....

THE CHALLENGE OF LEISURE

By Arthur Newton Pack

President
American Nature Association

The New York *Times* says:

"It is the most profoundly observing and keenly thought-out book on the subject of the significance and possibilities of the promised leisure that has yet appeared. *It deserves wide reading.*"

Price $2.00

Order from
AMERICAN NATURE ASSOCIATION
1214 16th Street, N.W. Washington, D. C.

Thrifty

By Orrell B. Taber

To most of us the squirrel is a familiar little fellow, for we see him daily in our gardens and parks. But to many this incident may correct a false impression of him and his habits of storing his food. We are accustomed to think of him as thrifty. But may we not be wrong in assuming that he has only one hiding place and fills it chiefly with nuts.

During the winter months when the ground is covered with snow I have thrown crusts of bread to the birds. Frequently these crusts seemed to disappear like magic. Although the birds came in large numbers I never saw them remove every crust and yet they disappeared. The real beneficiary was caught at work early one morning. Sitting on his haunches, balancing a large crust in his mouth, was a squirrel. When he succeeded in getting it perfectly balanced, he scampered off to a hydrangea bush, climbed to the top of it, and placed it in the crotch of one of the foremost branches. Then he went back for another piece. This he placed in the same manner, but, evidently out of balance, it fell to the ground. He quickly retrieved it and replaced it in the bush. Back he went for another crust and with perfect balance hid it in a Japanese cherry tree. I watched him hide four more pieces, each in its own place and quite remote from all others. His hiding places were the top of an old garden swing, among the branches of a peony bush, at the base of the bush where he covered it with snow, and finally at the top of a clothespole. It was striking to see the precision with which he worked and the perfect balance he displayed in his movements. Several days later I examined these hiding places, but found the crusts had been removed. Evidently these were temporary hiding places and the crusts had either been eaten or taken to a more secure place.

Conservation Unit

The latest addition to the Conservation Series of teaching units brought out by the Emergency Conservation Committee, 734 Lexington Avenue, New York City, is devoted to the fish-eating birds. It is the work of Ellsworth D. Lumley. This unit has a valuable service to perform to break down the erroneous and careless accusations that have been levied against many of our interesting and valuable birds in whose diet fish play an important part They have been the object of attack by over-zealous fishermen who grudged the birds the fish, in most cases undesirable species, that form their main food. This teaching unit brings out the facts and establishes a proper and well substantiated viewpoint on this issue.

New Leisure Book

The latest addition to the interesting and valuable collection of twenty-five cent books brought out by the Leisure League of America is entitled *Friendly Animals: A Book of Unusual Pets*. It is the work of Lucille Quarry Mann who combines a splendid writing style with a varied natural history background. Then, too, Mrs. Mann is the wife of the able and genial Director of the National Zoological Park in Washington, D. C., Dr. William M. Mann.

THE TEN-YEAR INDEX
makes Nature Magazine a textbook. Order yours now . . . 50c

Membership Nomination Blank

AMERICAN NATURE ASSOCIATION
WASHINGTON, D. C.

.....1935

Secretary, AMERICAN NATURE ASSOCIATION,
1214 16th St., N. W., Washington, D. C.

I nominate for subscribing membership in the Association and to receive NATURE MAGAZINE:

Name.....

Address.....

NAME AND ADDRESS OF NOMINATING MEMBER

.....

.....

ANNUAL DUES
United States . $3.00 a year
Abroad . . . $4.00 a year

90% of the annual dues is designated for subscription to the magazine

WHERE-TO-GO

HOTEL-RESORT AND TRAVEL DEPARTMENT

Established 1906

FEATURED EVERY MONTH IN EIGHT PUBLICATIONS

OUR GROUP OF QUALITY MAGAZINES

Atlantic Monthly, Current History, The Forum, Golden Book Magazine, Harpers Magazine, Nature Magazine, Review of Reviews-World's Work and Scribner's Magazine

For space and rates in our departments write to
THE WHERE-TO-GO BUREAU, Inc., 8 Beacon Street, Boston, Mass., U. S. A.

TRAVEL

VISIT JAPAN in Chrysanthemum Time

Gay days at sea on motor ships as modern as your favorite hotel. Rich, but restrained, luxury in all the appointments—*detailed* convenience of service which reflects the "centuries old" culture of Japan. • Regular sailings from Los Angeles and San Francisco.

JAPAN, CHINA, PHILIPPINES
Stop-over at Honolulu

LOW ROUND-TRIP FARES
from San Francisco and Los Angeles

First Class $542 up • Cabin Class $437 up
Second Class $332 up • Tourist Cabin $236 up

Also modern cabin and tourist cabin liners from Seattle and Vancouver direct to Japan.
Cabin Class $437 up • Tourist Cabin $227 up

Write to Dept. 96 • New York, 25 Broadway; San Francisco, 551 Market Street; Seattle, 1404 Fourth Avenue; Chicago, 40 North Dearborn St.; Los Angeles, 605 South Grand Avenue, or any Cunard White Star Limited office. Consult your local tourist agent. He knows.

N.Y.K LINE (JAPAN MAIL)

TRAVEL

SEE EUROPE *with your own car!*

This year you can't say it costs too much to transport your car to Europe. We offer to deliver it to you there (whether or not you accompany it as a passenger on this line) and to bring it back home again for $120 round trip. Even with all running charges you will find it saves money to have your car. Saves all bus and railroad fares, saves much handling of baggage and tips. If there are two or more people in your party it costs less to have your car than not to have it. *Oh, you will have a trip which the average tourist could not even dream about!* This is a new way to see Europe, that will be far more interesting, and make you more independent and comfortable.

Ask for folders!

ARNOLD BERNSTEIN LINE
17 Battery Place New York

Remember—small copy is BIG in Where-To-Go

ROUND THE WORLD TOURS FOR $575 PER DAY
100 DAYS . . $550 to $645
★ Cross the Pacific on One-Class "General" ships! Portland to Yokohama $172, Kobe $177, Shanghai $198, Hong Kong $215, Manila $215.
SEE YOUR TICKET AGENT OR WRITE DEPT WG
STATES STEAMSHIP LINES, Portland, Oregon

TRAVEL

Save 1220 miles TO THE ORIENT

American Mail Liners sail the fast Short Route from Seattle, saving 1220 miles to Japan, China and the Philippines, giving you more time in the Orient, where it counts. For information and literature, see your travel agent or write AMERICAN MAIL LINE, 1300 Fourth Avenue, Seattle, Washington.

AMERICAN MAIL Line

The Where-To-Go system influences the people comprising the cream of all Travel prospects.

TRAVEL RECORDS

MODELS of the SHIPS
ON WHICH YOU HAVE SAILED
A list of more than 300 liners
Models priced from $3.50 to $7.50
Order by names of vessels and lines
VAN RYPER VINEYARD HAVEN, MASS.

TRAVEL

WORLD TOURS

BALINESE MAIDEN

AT VERY LOW COST

Want to investigate Hong Kong, Bali, Singapore, and a dozen other magic names? Want to study people in all four corners of the globe? Plan *your own* route, stop-overs, and expenses. Go on one inclusive ticket . . . good for 2 years. Over 200 itineraries for you to choose from.

Folders from YOUR OWN TRAVEL AGENT or Canadian Pacific: New York, Chicago, San Francisco, 34 other cities in United States and Canada.

Canadian Pacific

When writing to these advertisers will you please mention The Where-to-go Bureau? It will be greatly to your advantage to do so.

Where-To-Go for Oct. closes Aug. 26

SUMMER IS
STILL AT HIGH TIDE
AT

Chalfonte-Haddon Hall

ENJOY it, as many families do, among the ample hospitalities offered by these Boardwalk hotels. Mid-season sports gladden the out-of-doors. Indoors, concerts, dances, varied amusement, and a personal interest taken in your comfort. • $7 up at Chalfonte, $8 up at Haddon Hall, single, American Plan. European Plan, single, at Haddon Hall, $5 up. Special weekly rates.

Leeds and Lippincott Company

ATLANTIC CITY

Our Mocking Bird

By W. Carnot Dodson

I have always claimed that the mocking-bird that sang from the tallest branches of the catalpa tree on our front lawn never had an equal; and I would match it against the trillingest Roller in all Canarydom. When it came to awakening the stilly atmosphere of morning with the cadence of bird-song, it was supreme. With all the timbre of a thoroughbred enriched with the clearness of special tutoring, it poured forth a scintillation of melody that must have been born of a heritage of warblers, free-mated.

As it ended a crescendo, it would, through sheer joy of living (I *know* it was that!) and a spirit of all's well with the world, bounce up with slightly spread wings, from the toppest branch as it marked time with muffled notes, to settle again on the swaying twig for another stanza of carol.

Many days we watched it as we listened to the pealing trills and siren calls of its morning, midday and evening serenades. Some day I'm going to ask an authority on birds whether the mockingbird or the canary possesses the greater repertoire. But then, no "authority" ever heard our mocker.

DREER'S BULB CATALOG

Just Published

Dreer's new Bulb Catalog is ready for you with a beautiful four-color cover and a wider variety of items for fall planting than ever before . . . Tulips, Narcissus, Hyacinths, Crocus, Daffodils, Iris, Lilies, etc. Also plants, shrubs and seeds for fall planting.

Quality at reasonable prices throughout! Send for your copy today. It's FREE.

HENRY A. DREER
197 Dreer Building
Philadelphia, Pa.

23 LANGUAGES

SPEAK ANY MODERN LANGUAGE IN 3 MONTHS BY LINGUAPHONE
UNIQUE METHOD BRINGS VOICES OF NATIVE MASTERS INTO YOUR OWN HOME..SEND FOR FREE BOOK

LINGUAPHONE INSTITUTE
45 Rockefeller Center • New York

Photographic Notes

BY SAMUEL BROWN

Many Nature photographers have the idea that only expensive cameras will take good Nature pictures. In order to dispel this mistaken conception we are going to show how it is possible to take excellent pictures of birds with an inexpensive camera.

Any camera equipped with a lens having a speed of F. 7.7 or faster and a shutter working as fast as 1/100 of a second will take good pictures of birds. If the camera has a double extension bellows, so much the better as this will permit close-ups. The most useful camera is one taking pictures 3¼ x 4¼ inches (size 118 or 124) because the subject can be centered most satisfactorily. Also, this size is just right to make transparencies for lantern slides. Another advantage is that it is possible to buy a combination back for this size folding camera to utilize ground glass focusing and a large selection of cut film emulsions and film packs.

Ground glass focusing is important when the bird is expected to approach a particular spot on which the lens has been trained some time before.

If roll film is used, a range finder or distance meter is indispensable. These are inexpensive little instruments that give the proper distance reading instantly. They also

IN THE NEST. TAKEN ON VERICHROME FILM AT F.L.6, 1/10TH OF A SECOND

come in very handy when the photographer must follow his subject and will minimize the number of out-of-focus pictures.

In setting up the camera beforehand focus and center it carefully on the nest or the place which has been baited. With a string attached to the shutter and extending back about 100 feet to the operator, wait for the proper moment, when the bird appears in an interesting pose, and pull the string which will release the shutter.

If the camera is very close to the nest it is best to camouflage it. This is best done with some leaves and branches or with a cloth which has been painted green and brown. Be extremely careful not to cover the lens. Covering the camera also protects it from the sun.

Large birds must be attracted to a position where they can be photographed by employ-

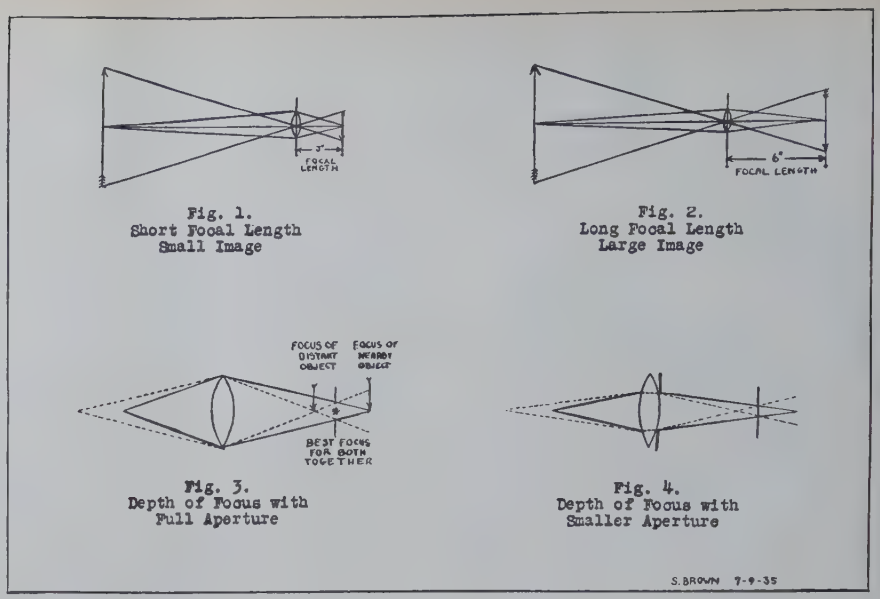


Fig. 1. Short Focal Length Small Image

Fig. 2. Long Focal Length Large Image

Fig. 3. Depth of Focus with Full Aperture

Fig. 4. Depth of Focus with Smaller Aperture

ing decoys. Waving a bright object slowly usually brings them within range.

Some additional apparatus which may be of value is: a rigid tripod or kodapod to hold the camera steady, a pair of field glasses for locating the subject, a piece of black thread with which to trip the shutter or to tie objectionable branches out of range and a mirror to reflect light to dark areas. Be sure to have enough films.

In using the ground glass for focusing, always focus sharply on the nearest edge of the nest and then stop down the diaphragm. In this manner a maximum depth of focus is obtained. In sunlight the camera can be stopped down to about F. 22 and 1/10 of a second exposure given, providing the birds do not move too fast. When faster shutter speeds are required a larger diaphragm opening must be used.

Nests located in the shade are better to photograph as they will show a greater amount of detail. Sunlight causes hard shadows and lack of detail in the dark areas. Another point to be remembered is that there is less wind during the early morning hours. The trees and branches remain stationary and longer exposures can be given.

Pictures showing various stages of development, from the eggs to the fully grown birds, are always interesting and valuable. If sufficient care is exercised, young birds may be taken from their nest and placed on a branch where they can be photographed. Do not do this unless the birds are strong enough to support themselves. When the pictures are taken, be sure to replace the birds carefully.

Many times, in the excitement of taking a picture, the background is neglected. It is important that this should be appropriate. Leaves and branches form a natural background for birds and nests.

* * *

Points About Lenses

The focal length of a lens is directly responsible for the size of the image projected on the film. The greater the focal length of the lens the larger the image. The reason for this is clearly shown in figures 1 and 2. From this it can be seen that a camera fitted with a long focus lens would be desirable in photographing distant objects. When a large field of view is wanted, one would, obviously, use a lens having a short focal length. For normal purposes it is best to use a lens whose focal length corresponds to the diagonal of the desired picture size. Wide angle lenses usually have a focal length equal to the narrow side of the picture.

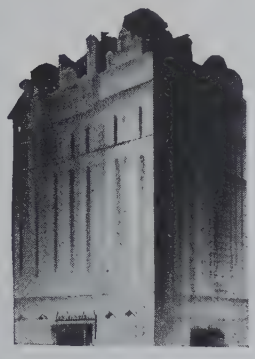
Depth of focus (as the distance between the nearest and farthest objects that the lens can focus sharply at the same time is called) is determined by the focal length of the particular lens in use and by the diaphragm opening. A lens having a short focal length

LUNCHTIME. TAKEN ON PLENACHROME FILM, F.L.1 1/25TH OF A SECOND

has great depth of focus; one having a long focal length has little depth of focus. A lens used at a large diaphragm opening has little depth of focus which increases as the lens is stopped down. This is due to the narrowing down of the rays of light as shown in figures 3 and 4.

The point known as infinity, or the distance beyond which everything will be sharp, varies also with the focal length of the lens. The one with the longer focal length will be at a greater distance than the one with the shorter focal length. *These are unalterable optical laws.*

IN PHILADELPHIA



All the luxuries and comforts of modern living . . . a gracious hospitality famed the world over . . . and at the very hub of Philadelphia's social and commercial life. Theatres, shops, sports, transportation and your appointments but a step away.

Air Conditioned Restaurant
Rates as Low as $3.50

BELLEVUE STRATFORD

One of the World's Great Hotels

CLAUDE H. BENNETT, General Manager

YOU NEED

LEISURE

The Magazine of a Thousand Diversions

The only magazine catering to the leisure tastes of every member of the family. It is educational without being scientific. You find new introductions to Games—Sports, Hobbies—Collections, Books, Photography . . . Creative Arts, Puzzles, Dramatics, Travel, Music, Hand Crafts, Nature Study and many other activities.

INSTRUCTIVE
ENTERTAINING
STIMULATING

Read what outstanding Recreation Directors, Educators, and Civic Leaders say about LEISURE:

"Leisure is a distinct contribution to the still pioneer American which has come to a new frontier of life—Leisure Time." Howard L. White, Director of Recreation, Heckscher Foundation for Children.

"A magazine like yours can do much to save our young people from finding unwholesome outlets for their surplus energies by putting before them in attractive and authoritative form the many fields of activities which will satisfy their cravings for adventure, for creation, for co-operation, and for leadership." Ernest Hermann, Dean, Sargent School of Physical Education.

"Your magazine has been recommended to me by the State Department of Education." F. A. Bell, Supt., Amador County Schools, Cal.

"A copy of Leisure in every home would be a Godsend to folks who have never before had the time for recreation, nor the education for its use." R. A. Hoyer, Director, Dept. of Boy Guidance, Graduate School, Notre Dame University.

Special Offer to Readers of Nature Magazine

15 months only—$1.00

Fill in your name and address, send bill, check, stamps or M. O. (Canadian or Foreign Post—50c. extra). N

LEISURE, 683 Atlantic Ave., Boston, Mass.

Please send your special 15 months' offer—$1.00 enclosed.

Please Print

NAME .....

ADDRESS .....

CITY..... STATE.....

Most subjects that are photographed should show as much depth of focus as possible, unless special effects are wanted. For example, in photographing landscapes, the picture will be most pleasant if everything is sharp. For this reason it is best to stop down the diaphragm as far as possible, usually F. 22 or F. 32, to insure maximum depth of focus. This will, of course, necessitate a long exposure and the use of a tripod or other firm support. However, when photographing animals, birds, insects, or any subject which moves or when there is danger of movement because of wind, it is necessary to give as short an exposure as possible and for this reason a larger stop must be used. The resulting depth of focus will be much less than when a small stop is used and therefore it is essential to set the camera for the correct distance.

It is wise to use the slowest possible shutter speed that is practical for the subject to be photographed. In this manner the lens can be stopped down correspondingly and greater depth of focus will result. Be certain to give sufficient exposure to insure a fully timed negative.

(Editor's Note: Many comments concerning this new series of short articles on the technical side of photography have come in. All of them request that they be continued. We wish to thank all of our readers who have written in concerning this and want to say how happy we are to have your letters. We are always open to new suggestions and criticism.)

* * *

"Trade Hints"

A fully illustrated booklet giving some important and essential points and information concerning focal plane shutters, the correct use of stop openings, shutter speeds necessary under various conditions, depth of focus, angle of view, exposures in artificial light, etc., is available, without charge, from this department. Everyone taking pictures should have one! Ask for the "Lens and Shutter Booklet". Enclose a self-addressed stamped envelope plus a one-cent stamp.

* * *

One of the most remarkable values in cameras has just been brought to this writer's attention. A *mirror reflex camera* equipped with an F. 6.3 lens for only $17.50; with an F. 4.5 lens for $26.50! Write for literature.

* * *

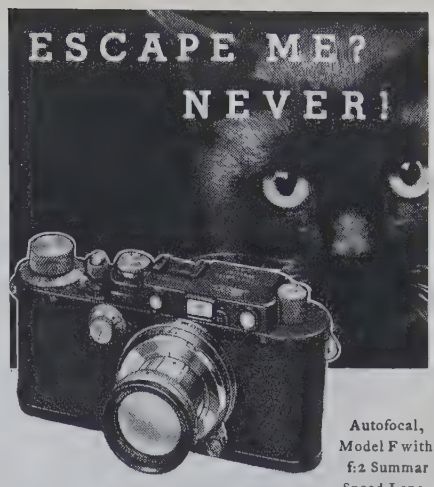
"Perim," a fine grain developer and "Pertone," a universal paper developer, are inexpensive and reliable. Literature from this department or from Dept. T-91, Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.

* * *

Literature concerning the new "Graflex Copygraph" has just arrived. This is an apparatus to which any camera affording ground-glass focusing can be fitted to make copies, photomicrographs, table-top studies, close-ups of flowers, insects, etc. Because of lack of space in which to give details, we suggest you send to this department for illustrated leaflet giving prices and full details.

* * *

The "Leudi" exposure meter is one of the most interesting little instruments this writer has used. It is of the optical type, size 1 x 1½ x ⅜" and sells for only $1.75. If interested write for literature.



Autofocal, Model F with f:2 Summar Speed Lens.

I am the candid camera

The CAT'S EYE LEICA

I SEE all and get **all.** I'm a sure shot and bring 'em back **alive.** Night or day, indoors or out, in the field, around the campfire, in the cabin—I'm always ready at the press of a button to catch revealing "candid" pictures of you and your friends.

• • •

LEICA has the greatest range of shutter speeds of any miniature camera—from one full second to 1/1000 of a second. Takes pictures in natural color, without extra equipment. Focuses automatically. Operates at press of a button. Fits in your pocket.

Write for illustrated booklets.

PRICES START AT $99 • U. S. PAT. NO. 1,960,044

E. LEITZ, INC. • DEPARTMENT 50
60 EAST 10th STREET • NEW YORK CITY

PHOTOGRAPHIC EQUIPMENT FREE CATALOG

Save Money on Cameras and Accessories —New and Used. Still and Movie—all guaranteed. Send for FREE Bargain Bulletin. Old Equipment taken in trade.

Dept. T-9 CENTRAL CAMERA CO., Est. 1899 230 S. Wabash Ave. Chicago, Ill.

MAKE MONEY with your CAMERA

Magazines, newspapers, advertisers BUY many millions of photos a year from people *who know how* to take the kind of pictures wanted! Let us teach you how to take real human-interest pictures that SELL! Our personalized home-study course—the most complete training in Journalistic Photography ever offered—prepares you to make good money in this fascinating field—quickly, *at low cost,* in *spare-time.* Write now for FREE Book.

LEARN AT HOME

UNIVERSAL PHOTOGRAPHERS
Dept. 239, 10 W. 33rd St., N. Y. C.

Learn Photography at HOME

Make money taking pictures. Prepare quickly during spare time. Also earn while you learn. No experience necessary. New easy method. Nothing else like it. Send at once for free book, *Opportunities in Modern Photography,* and full particulars.

AMERICAN SCHOOL OF PHOTOGRAPHY
Dept. 1606, 3601 Michigan Avenue Chicago, U. S. A.

MIRAKEL
OPT. CO
DAYLUX
BINOCULAR

POCKET PRISM NATURE GLASSES

3½ power $13 to $18; 5 power $13 to $17; 6 power $16.50 to $20; 7 power $19.50 to $35; 8 power $18.50 to $37.50. Microscopes $1. and up. Sent on approval, post paid. We carry everything in new and used glasses. Catalogue free. What have you to exchange?

J. Alden Loring Box K-2 Owego, N.Y.

About Ohio Trees

Although he passed away before the book went to press, Dr. William B. Werthner has left a worthy monument in his book *Some American Trees.* This volume, just published by the Macmillan Company, is sub-titled *An Intimate Study of Native Ohio Trees.* It also might be described as an affectionate study, since the author was a lover as well as student of trees and this is reflected in his text. It represents a lifetime of study, during which Dr. Werthner photographed trees entire and in detail, these pictures adding measurably to the text. The book is not merely a guide to the trees, but includes much interesting material on their history and importance in the development of Ohio; their use to the Indians and the first settlers; and their present position in the Ohio of today. The price is five dollars.

Friends of Man

By L. Obed Renne

Most birds promote human welfare. Some species have harmful habits, but in the main, birds are important factors in our economic life, while they augment the aesthetic and joyous experiences of mankind.

The study of birds and their admirable characteristics is fascinating and it is improbable that from all these helpful creatures one could be chosen as the most estimable. Van Dyke, Wordsworth and other Nature-loving poets have paid imperishable tribute to many of our feathered friends. The song of the thrush and that of many of its kindred is enchanting. The demure bluebird with its low, sweet warble is an endearing, friendly associate. The dainty, colorful hummingbird is an animate jewel. The house wren with its cheerful melody and plucky disposition is intensely interesting. No, we cannot segregate one and say, this is the best.

The wren often selects extraordinary places for its nest. A pair of them built their home, within reach, at the passageway of the rear porch of my house in Springfield, Illinois, and steadfastly defied any intruder to come near. Upon returning home after a week's absence I found the newcomers established and it was several days before I was *allowed* free access around the place. The alert male flew at my head and pecked resolutely. Even cats were routed. With prudence I finally convinced the game little tenants that I was a friend, and the spirit of amity reigned thereafter. Their mirthful song gladdened the dooryard and it was a pleasure to watch them feed their young as they gleaned cutworms and other obnoxious parasites from the garden. The second season they were quite friendly from the outset and I had the privilege of going close to see the nestlings and within reach of the parent birds without being reprimanded.

A chink in a log at Grandfather's house in Sangamon County was the home of wrens to which they returned year after year. A pair of wrens built and reared their young for successive years in a gourd on the side porch about four feet from the floor at the Will Trainor home north of Springfield. The practical use of the porch in close proximity did not intimidate these spirited birds.

Wrens have built in old hats, coat-pockets, harness, various buildings and equipment. The most remarkable place I have observed chosen by wrens for their nest is the one I happened to notice recently as one of these elves flew into the skeleton head of a whale in Golden Gate Park, San Francisco. People strolling in the Park may see this phenomenon. Doubtless the nest still remains, although the birds may have flown. The bleached mammal head is suspended beside the great whale skeleton not far from the "Garden of Shakespeare." What a thought study in the coordinating cycle of time. The carnivorous sea monster that glided through the fathomless waters of the sounding main in its quest for a livelihood is now the home of blithe, tiny winged creatures.

It is edifying to pause in our mad, competitive rush through this transient life and contemplate the marvels of God's Creation. Surely, birds have a message for man.

The Nez Percé War

Under the title of *Adventures in Geyser Land,* Heister Dean Guie and L. V. McWhorter have combined a republication of Frank C. Carpenter's narrative, *The Wonders of Geyser Land,* with new material bearing upon the story of the Nez Percé Indian Campaign of 1877. Mr. Carpenter brought out his story in 1878 and in it told of his capture by the Indians and other thrilling events of this war. The Carpenter story has become a collector's item, but it is fascinating reading that merits its resurrection in the form of a book such as the present one. The publishers are the Caxton Printers, Caldwell, Idaho. The price, two dollars.

Importing Wasps

Traveling over the fastest air and water routes, three lots of promising little wasps from Egypt recently reached the United States. They are now building up an army soon to be turned loose against the pink bollworm in the few North American cotton fields invaded by this pest. The pink bollworm—the most destructive cotton pest in nearly all the important cotton-growing countries of the world—has not yet reached the main Cotton Belt here. Every effort is being made to keep it from doing so.

"A few of these wasps," says C. P. Clausen, in charge of insect parasite introduction, "were obtained with the assistance of the Egyptian Ministry of Agriculture and increased by entomologists of the United States Department of Agriculture on the other side of the world. Then they were shipped to the Department's insectary at Presidio, Tex., making the trip from Cairo in about 2 weeks."

One of the small aliens—*Microbracon kirkpatricki*—has long been a natural enemy of pink bollworms in East Africa. It was successfully colonized in Egypt several years ago, but efforts to import it into North America failed. The delicate little insect could not stand the long, hard journey. Air express and fast ocean liners, with modern refrigeration facilities, however, have removed the hazard of travel for *Microbracon.* From the Egyptian parents that came safely over the great stretch of land and sea a large number of American-born wasps are now ready in the Presidio insectary for release in cotton fields.

The other two insect newcomers—*Exeristes roborator* and *Elasmus*—are native parasites of the pink bollworm in Egypt. Some time ago *Exeristes* was brought into the United States from Europe to prey on the European corn borer. When liberated against the pink bollworm in Texas, however, this wasp seemed unable to adapt itself to conditions there. Perhaps, entomologists say, the strain from the banks of the Nile will do better.

A Bird Lover Loves a Cat!

By Marion C. Ebersole

We are bird lovers, the Boy, Mother and Daddy, and spend many happy minutes—hours, if you total the time—watching the little feathered visitors and listening to their songs. We know by sight fifty-odd wild birds and the females of some, and know by song a score or more and the calls and cries of many. We are not experts on bird lore, but we love the birds. And we have a cat whom we also love!

When the Boy was six years old we moved to a big city, and for the next four years we lived in an apartment house. There were few birds, except the ever present English sparrow. The Boy needed a pet, but dogs were not allowed in our building. Therefore when, one Christmas morning, a not quite grown cat, showing unmistakable signs of aristocracy and good breeding, walked in and insisted on staying with us, we thought that Santa Claus must have left her, and we decided to keep her. In the spring her kittens proved to be too many in our cramped quarters. So we singled out Buster as the one to keep. We became greatly attached to the furry fellow. When he was a year and a half old, we moved to a smaller city; and naturally we brought Buster with us.

Here our home is in a single house, in a neighborhood of houses, with many old trees, vines, shrubbery and gardens all about. With the coming of spring we have been delighted to find that birds are not strangers in this neighborhood. Robins nest under an eave next door, sheltered by a limb of a boxelder tree, and pull worms from our yard and garden. Brown thrashers are raising a family in the thick growth of a syringa bush and sing to us often. Cardinals have built in the honeysuckle vine gone wild over the porch of the vacant house next door, and shy Mrs. Cardinal occasionally visits our yard.

Rose-breasted grosbeaks and their little rown wives delight in clinging to old eed pods of the catalpa tree out front, ripping and eating the seeds, and even aring to come within five feet of us to rip seeds fallen on the ground between the orch and a bush. Catbirds daily sing along regular route through the block. Baltimore rioles are easily heard making their rounds, ut they flit from perch to perch too quickly o be seen as easily. Yellow warblers, chest-ut-sided warblers, and perhaps other war-lers, occasionally visit the vines, shrubbery nd little trees about our porches and be-ween houses. Several wrens sing at their ork all day long.

Flickers eat our ants and drum on the idge of our old barn-garage. Telephone oles in the alley are favorites for red-headed voodpeckers. Hairy and downy woodpeckers ppear low in the trees out front now and hen. Doves coo on our telephone wires. Bluejays shriek and dart about, or show ff on the low roof next door. Stray chipping parrows chip about the lawn; the hearty olo of a song sparrow floats in rarely; and ve suspect sights of other sparrows. An old an sunk in the ground at the foot of a ree, and kept filled with water, is more pop-lar as a watering place than the more rnate bird-baths in neighboring yards.

Most every evening at dusk, as the robins re hushing their songs, a wood thrush—een occasionally during the daytime—sings is bell-like song from the depths of a vild plum tree by the garage. What a con-rast to the jarring din purple grackles set p in the tall trees down the block. Night awks squeak overhead, but we never hear heir zooms. Owls continue their gentle "Who-o-o's" in a nearby woods. From the awakening chorus of robins and cardinals t dawn to the peaceful evening serenade of he thrush and the goodnight calls of owls, our spring days in a small city home are rightened and cheered by sights and songs f the birds. Strolls through nearby woods ffer additional pleasing experiences with our feathered friends. No wonder that we love the birds.

And we continue to own a cat, whom we love! Buster has been very much a pet pussy since the Boy and Daddy took him to a veterinarian. He never had been allowed to go out at night, and now he is kept in very closely. The cellarway door is left open and he is trained to go to the basement. Daddy does not mind the extra work this means, for he is a bird lover. Once each midday, when the birds are more quiet, one of us takes Buster out; not on a leash, but under close surveillance. He is allowed to go his own way, within limits. He smells and rubs all around, chews bits of grass for salad, rolls on the warm sidewalks and drives, pounces on bugs in the grass, and scratches his claws on trees. But the min-ute he shows an inclination to run, climb, or tuck himself under a bush for some watch-ful waiting, he is taken into the house.

Of course Buster does not like to come in. He sits quivering on a windowsill, while warblers dart from bush to bush. He runs hopefully from door to door. He chases an acorn all over the floor, pretending it is a mouse or a bird. Finally he reconciles himself to his lot, and curls up on his cush-ion to sleep.

Yes, we love our cat. But we also love the birds, and believe that they should be pro-tected.

The World's Day
Its News at a Glance
Air Police—Could Detect N. Y. Traffic Jams
By a Staff Correspondent of The Christian Science Monitor
NEW YORK—Hovering over New York City's Sunday traffic snarls in an autogiro, Harold Fowler, deputy police commissioner, yesterday studied the possibility of directing traffic from the air.
His plan for aerial traffic "cops" came from London and from experiments with American football game traffic, where incipient tangles have been averted even before they jammed the highways. The aerial director would spot a converging of cars, radiotelephone orders to police cars, and divert the surplus traffic to other arteries.
Many a New Yorker who still bravely drives a car, and battles for many a weary, honking, odorous hour trying to get out of the city for a glimpse of greensward, heard of the plan with high approbation.
Far East—Ch
pitulates to Japan
The Christian Science Monitor
Sharp Japa
distinguished from the velvet hand of
e set up a virtual Japanese pro-
THE CHRISTIAN SCIENCE MONITOR

Try This Quick Pleasant Way to be Well Informed

The World's Day—a new feature of The Christian Science Monitor—compresses into brief, pungent paragraphs, the highlights of world happenings. Busy men and women, by devoting a few moments daily to this column, can keep reliably and lucidly informed on major world developments.

In addition, as always, the Monitor presents complete news stories—by wire, wireless, cable and mail—from its hundreds of trained correspondents all over the world. Regular weekly and semi-weekly pages and special articles treat in detail such important interests as art, music, books, education, sports, finance, fashions, foods. The Weekly Magazine Section, part of every Wednesday edition, is a vital, authoritative interpretation of world events and record of world progress.

$1.00 Get-Acquainted Offer

Readers of this magazine may receive the Monitor for a trial period of six weeks at the special rate of $1. Take advantage of this offer. Invite the Monitor to your home daily for the next six weeks. See if it does not meet a long-felt need. Use the coupon below.

THE CHRISTIAN SCIENCE MONITOR

AN INTERNATIONAL DAILY NEWSPAPER

Published by **The Christian Science Publishing Society**
Boston, Massachusetts

THE CHRISTIAN SCIENCE MONITOR
Dept. NM-9, One Norway Street, Boston, Massachusetts

☐ **Please send The Christian Science Monitor to the address below for six weeks (36 issues) beginning at once. I enclose $1.00.**

Name .....

Address .....

Price of Regular Monitor Subscriptions:

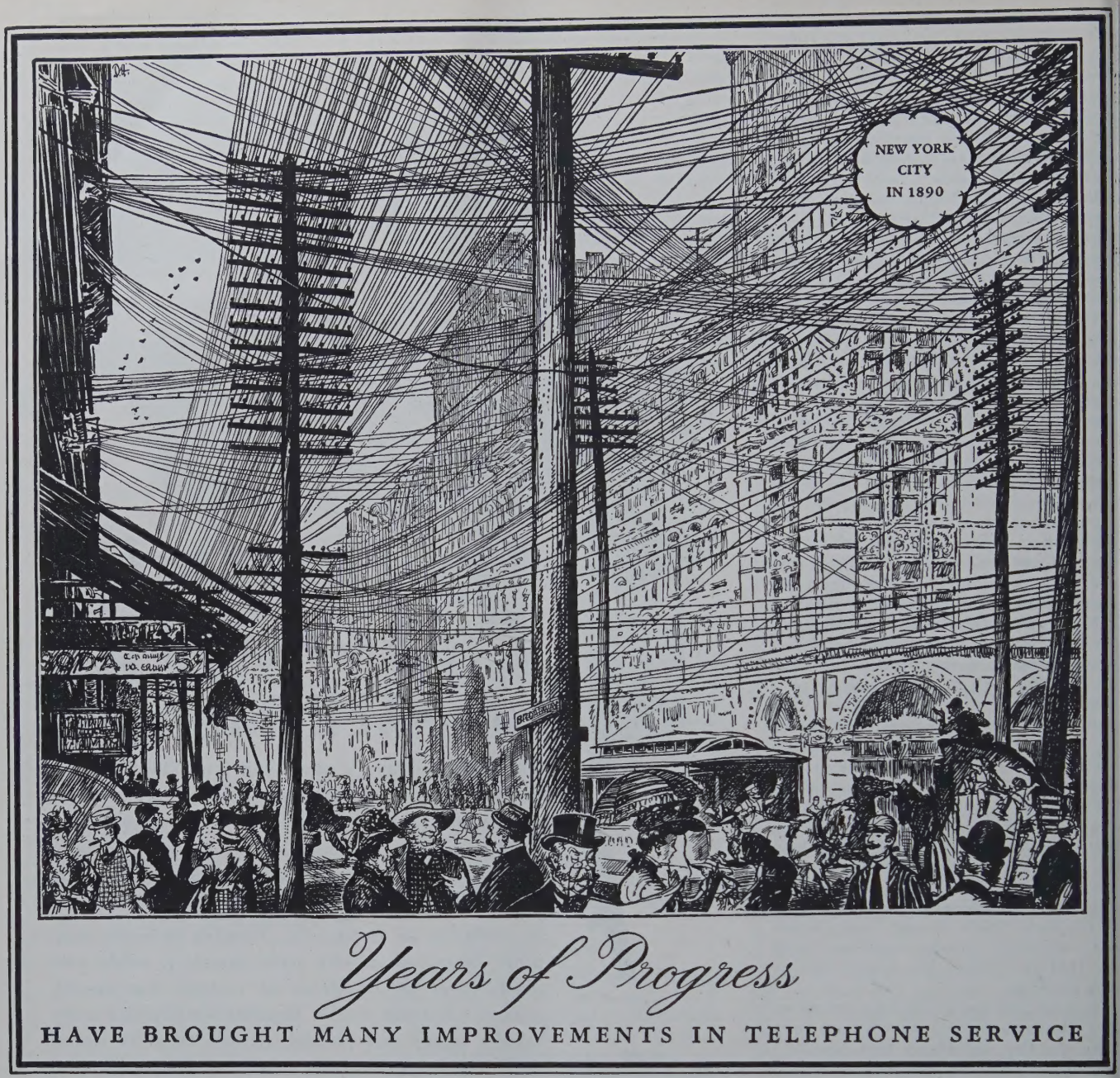
☐ 1 month $0.75
☐ 3 months 2.25
☐ 6 months 4.50
☐ 1 year 9.00

The Wednesday issue only, including the Magazine Section:

☐ 1 year $2.60

Special offer,

☐ 6 issues ..... .25



Years of Progress

HAVE BROUGHT MANY IMPROVEMENTS IN TELEPHONE SERVICE

BACK in the early days of the telephone, practically all wires were carried overhead on poles or on house-tops. Some of the tallest poles carried as many as thirty cross-arms and three hundred wires.

If the old system were in use today the streets of our larger cities would scarcely have room enough for their canopy of wires. Traffic would be impeded, telephone service subject to the whims of nature.

Better ways had to be found and the Bell System found those ways. As many as 1800 pairs of wires are now carried in a cable no larger than a baseball bat. Ninety-four per cent of the Bell System's 80,000,000 miles of wire is in cable; sixty-five per cent of it is beneath the ground.

This has meant a series of conquests of space, and insured greater clarity and dependability for every telephone user. But it is only one of many kinds of improvements that have been made.

The present generation does not remember the old days of the telephone. Service is now so efficient that you accept it as a matter of course. It seems as if it must always have been so. Yet it would be far different today if it were not for the formation and development of the Bell System.

Its plan of centralized research, manufacture and administration — with localized operation — has given America the best telephone service in the world.

Americans talk over Bell System wires 59,000,000 *times a day. In relation to population there are six times as many telephones in this country as in Europe and the telephone is used nine times as much.*

BELL TELEPHONE SYSTEM

September

SEPTEMBER begins with an ending, ends with a beginning; and in the midst of the month comes the long-lingering harvest moon—month of transition from summer to autumn, with a full moon that for a few nights seems almost to have come to stay for a while. With Labor Day summer seems more definitely to end for the city dweller than with the sun's crossing the equinoctial line three weeks later, for the holiday dedicated to Labor marks the end of vacations, return to school, and resumption of business-as-usual at the office or shop. Then the dog days end, and September settles down. Back in memory to the days of June one must go for comparisons with the pleasant bright days of this month, but the later pleasantness has more of peacefulness and contentment, less of exuberance and zest. Thinking for images in Nature to express the subjective influences of these thirty perfect September days—almost as rare as June days—one remembers again how the river described by Whittier

> . . . . . winding through its vales of calm,
> By greenest banks, with asters purple-starred,
> And gentian bloom and goldenrod made gay,
> Flows down in silent gladness to the sea,
> Like a pure spirit to its great reward!

Yet September quickly runs on to a close, and after nearly a month of hints of prophecy, one almost suddenly realizes that autumn has begun.

Continuing evidence of summer activity comes from the insect orchestration produced by cicada, katydid, and cricket. On a Labor-Day excursion to the beach, or under some old shed roof in the country, one may have watched the unfortunate ants sliding into the symmetrical funnel-traps excavated in sand by an ant-lion—squat and ugly larva gathering strength for its later transformation to an elegant and slender lace-wing fly. The grass spider, maker of the webs that have been jeweled in morning sunlight after dewy nights, is in September beginning to prepare for the preservation of its species through the winter. No individual grass spider lives from summer to summer, but the species persists in the egg-sacs that the females, about to die, store under loose bark on trees or stumps or in other hidden places. In September one may also find the leaf-walled nests of the nursery-web weavers, those spiders that at all times recently wherever they have gone have carried with them their cumbersome egg-sacs and have now provided a nursery for the young, three hundred or more, or less. As the arachnids are thus maintaining their numbers in differing ways, the moths and butterflies too are providing variously for the passage through winter. Cocoons are the evidence for many species, but the season is more apparently signalized by the migrating monarch butterflies making their way, like southward falling leaves, to warmer latitudes.

The birds, greatest of travelers, are returning from their summer resorts and winging their ways to wintering grounds. Early in the month the rough-winged swallows and the orchard orioles are leaving for Costa Rica and Colombia. Before long the purple martins are off for Brazil, the Baltimore orioles are following their cousins, and the yellow warblers are making for Guiana, Brazil, or Peru. And later in the month the kingbirds are starting for the region of their winter domains from southern Mexico to Bolivia, the wood pewees are leaving for Nicaragua or south to Peru, and the rose-breasted grosbeaks are about to fly to southern Mexico or Yucatan or on as far south as Venezuela or Ecuador. The heavens are the scene this month of the movements of thousands of migrating birds as these and many other species respond to the season's urge. Birds of still other species are gathering together—sparrows and juncos and towhees. The red-winged blackbirds are in flocks, and the bluebirds, gathered in choruses, are singing farewells to summer, greetings to autumn, and praises for September.

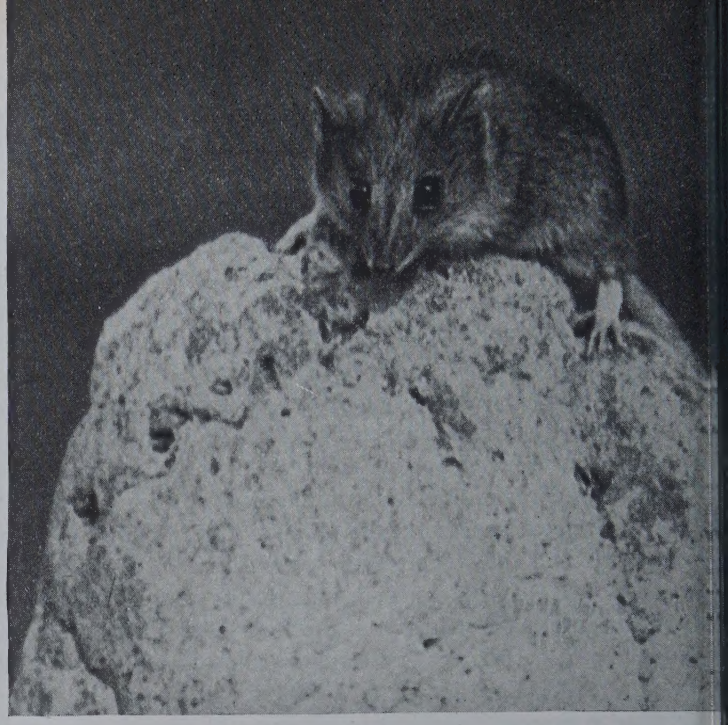
Nor is this month of final summer displays and autumn pre-views without its own distinctive appearances in flowering plant and tree. The witch-hazel bears its axillary clusters of bright yellow flowers in September—the last of the trees to bloom—and in low meadows and moist, open woods the fringed gentian is waving those flowers that look through "fringes to the sky", the flowers that inspired Bryant by their late-coming alone and their heavenly color—

> Blue—blue—as if that sky let fall
> A flower from its cerulean wall.

Other flowers adorn September—the smooth aster with its blue or violet ray flowers and its tawny centers in open fields, the pinkish purple spicy fleabane in salt marshes along the coast, and the swamp sunflower with its purple-like disks and brilliant yellow ray flowers. And, as always, in any month, after those to be named are set in their sentences, there are others.

Yet, after all, in the end, September is the beginning of autumn, and the season's coming has through many of the days of the month been painted on the landscape by ivy, Virginia creeper, sumac, and dogwood. Grapes are ripe and purple. Windfalls of apples are on the ground. Already the red maple stands out brilliantly against the green of other trees. Vanguard of autumn, it starts the riot of colors that will last through October and into November. Its virtues, as Thoreau said, are as scarlet; one can not escape its testimony; and one knows when he is a witness to the red maple that he has again lived through another summer.

By HOWARD ZAHNISER.



Three interesting mammals of Australia. Above, one of the little mouse-like marsupials, making its meals off insects and belonging to the genus Phascogale. At the left, the common opossum of the eucalyptus forests. It has been sadly reduced in numbers owing to trapping for fur. Below, the spotted native cat, nocturnal marsupials now rare owing to the spread of civilization and to a mysterious disease that has ravaged their ranks in recent years. This attractive little cat represents the carnivores among the varied marsupial group in Australia. These and other photographs in this article copyright in Great Britain and the United States by Donald F. Thomson.